Gunnedah Shire Council

18 September 2025

Notification of Modification of Consent Application No. 2015/054.006

Site Description: Lot: 12 DP: 1244571, 299-319 Kamilaroi Road GUNNEDAH.

Notice is given that a Section 4.55(1A) Modification to Consent Application for the subdivision of 2 lots into 25 Lots has been submitted for Council's consideration that involves the removal of 'Building Envelopes' from the lower side of Vera Close and involves the introduction of Lot 115 in DP755503 into the development for drainage of water. The water drains from this holding through Lot 108 in DP755503 via a natural water course and the installation of a concrete causeway on Kamilaroi Road opposite the outlet of the waterway on Lot 108 in DP755503.

The address of the proposed development is 299-319 Kamilaroi Road GUNNEDAH.

The applicant is Mr G Avard C/- Stewart Surveys Pty Ltd and Gunnedah Shire Council is the consent authority.

The Development Application is considered 'Integrated Development', as an approval is required from the Rural Fire Service under Section 100B of the *Rural Fires Act 1993* and Department of Planning, Housing and Infrastructure – Water under Section 90 of the *Water Management Act 2000*.

The Application to Modify Consent has been placed on public exhibition for a period of **32** days. The documents may be inspected at Council's office during office hours 9am-4pm or on Council's website http://www.gunnedah.nsw.gov.au/.

Any person may make a written submission about this application to the General Manager, Gunnedah Shire Council, PO Box 63, Gunnedah NSW 2380 or via email council@gunnedah.nsw.gov.au. The issues you raise will be included in the evaluation of the development application, along with the other matters Council must consider.

Submissions should be received no later than 5.00pm on **20 October 2025.** All submissions **must** include disclosure of any reportable political contribution or gift made in the previous two years.

If the submission includes an objection to the proposal, the grounds of objection must be given. You are advised that you may request that your name and address not be disclosed by stating prominently "OBJECTION IN CONFIDENCE" on your submission for reason that disclosure would result in detriment to you. However, Council may be obliged to release these details under the Freedom of Information Act 1989 even if these words are used in the submission. Further, submissions that do not contain the author's name and address may not be considered as Council will be unable to validate the submissions authenticity.

If you have any enquiries in relation to this Development Application, please contact Council's Duty Planner on 02 6740 2100.

Yours faithfully

Wade Hudson
MANAGER DEVELOPMENT ASSESSMENT

Contact: 02 6740 2100
Reference: 2015/054.006

PO Box 63 (63 Elgin Street) Gunnedah NSW 2380
T +61 2 6740 2100 E council@gunnedah.nsw.gov.au
www.gunnedah.nsw.gov.au

Development Consent Cover Sheet – Council's Use

Made under the Environmental Planning & Assessment Act.1979

LAST UPDATED 23 JULY 2021

Date: 04/09/2025

DEVELOPMENT APPLICATION NUMBER

Development Application Number: 2015/054.006

APPLICANT DETAILS

Name(s): George Avard C/- Stewart Surveys Pty Ltd

[redacted]

LAND TO BE DEVELOPED

Address: 299 Kamilaroi Road, Gunnedah

Lot Number: 12 DP Number: 1244571 Site Area: 85.15 Ha

BRIEF DESCRIPTION AND USE OF PROPOSED DEVELOPMENT

S4.55(1A) - Modification to Subdivision

PROPOSED DEVELOPMENT DETAILS

☒ Local Development

☐ Integrated Development (requires approval under another Act)

☐ Designated Development (requires an EIS to be submitted)

Total Project Value: $725,000.00

PO Box 63 (63 Elgin Street) Gunnedah NSW 2380
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Pre-Lodgement Application Form

Portal Application number: PAN-567182

Applicant contact details

First given name	George
Other given name/s	
Family name	Avard
Contact number	[redacted]
Email	[redacted]
Address	C/- Stewart Surveys, 109 Conadilly Street, Gunnedah
Application on behalf of a company, business or body corporate	No

Owner/s of the development site

Owner/s of the development site	A company, business, government entity or other similar body owns the development site
Owner #	1
Company, business or body corporate name	Emerge Developments
ABN / ACN	88 087 007 930

I declare that I have shown this document, including all attached drawings, to the owner(s) of the land, and that I have obtained their consent to submit this application. - Yes

Note: It is an offence under Section 10.6 of the Environmental Planning and Assessment Act 1979 to provide false or misleading information in relation to this application.

Site access details

Are there any security or site conditions which may impact the person undertaking the inspection? For example, locked gates, animals etc.	No

Developer details

ABN	
ACN	
Name	
Trading name	
Address	
Email Address	

Development details

Application type	Modification Application
On what date was the development application to be notified determined	22/10/2015
Type of modification requested	S4.55(1A) - Modification involving minimal environmental impact, where the development will remain substantially the same as the development that was originally approved
Development Application number of the consent to be modified	2015/054.002
Description of the proposed modification	Please see attached letter addressing modification.
Was the DA applied for via the NSW Planning Portal?	No
What is the Development Application number of the consent to be modified?	2015/054.002

Site address #	1

Street address	299 KAMILAROI ROAD GUNNEDAH 2380
Local government area	GUNNEDAH
Lot / Section Number / Plan	115/-/DP755503 ☐ 1/-/DP1135280 ☐ 108/-/DP755503 ☐ 12/-/DP1244571 ☑ 2/-/DP1135280 ☐
Primary address?	Yes
Planning controls affecting property	Land Application LEP Gunnedah Local Environmental Plan 2012 Land Zoning C3: Environmental Management R5: Large Lot Residential RU1: Primary Production Height of Building NA Floor Space Ratio (n:1) NA Minimum Lot Size 1.2 ha 200 ha 40 ha Heritage NA Land Reservation Acquisition NA Foreshore Building Line NA

Proposed development

Selected common application types	Subdivision
Description of development	Please see attached modification letter
Dwelling count details	
Number of dwellings / units proposed	
Number of storeys proposed	
Number of pre-existing dwellings on site	
Number of dwellings to be demolished	
Existing gross floor area (m2)	
Proposed gross floor area (m2)	0
Total site area (m2)	
Cost of development	
Estimated cost of work / development (including GST)	$725,000.00
Capital Investment Value (CIV)	$725,000.00
Do you have one or more BASIX certificates?	
Subdivision	
Number of existing lots	2
Type of subdivision proposed	Torrens Title
Number of proposed lots	25
Proposed operating details	

Number of staff/employees on the site	

Number of parking spaces

Number of loading bays	
Is a new road proposed?	Yes
Description of the proposed roadworks	See attached plans
Concept development	
Is the development to be staged?	Yes, this application is for staged development which may include concept and/or multiple stages.
Is it a concept only application?	No
Description of the proposed staging of the development	Please see attached documents.
Crown development	
Is this a proposed Crown development?	No

Related planning information

Is the application for integrated development?	No
Is your proposal categorised as designated development?	No
Is your proposal likely to significantly impact on threatened species, populations, ecological communities or their habitats, or is it located on land identified as critical habitat?	No
Is this application for biodiversity compliant development?	No
Does the application propose a variation to a development standard in an environmental planning instrument (eg LEP or SEPP)?	No
Is the application accompanied by a Planning Agreement ?	No
Section 68 of the Local Government Act	
Is approval under s68 of the Local Government Act 1993 required?	No
10.7 Certificate	
Have you already obtained a 10.7 certificate?	
Tree works	
Is tree removal and/or pruning work proposed?	No
Local heritage	
Does the development site include an item of environmental heritage or sit within a heritage conservation area.	No
Are works proposed to any heritage listed buildings?	No
Is heritage tree removal proposed?	No
Affiliations and Pecuniary interests	
Is the applicant or owner a staff member or councillor of the council assessing the application?	No
Does the applicant or owner have a relationship with any staff or councillor of the council assessing the application?	No

Political Donations	
Are you aware of any person who has financial interest in the application who has made a political donation or gift in the last two years?	No
Please provide details of each donation/gift which has been made within the last 2 years	

Sustainable Buildings

Is the development exempt from the *State Environmental Policy (Sustainable Buildings) 2022* Chapter 3, relating to non-residential buildings?	Yes
Provide reason for exemption. Is the development any of the following:	Development that is wholly residential

Payer details

Provide the details of the person / entity that will make the fee payment for the assessment.

The *Environmental Planning and Assessment Regulation 2021* and Council's adopted fees and charges establish how to calculate the fee payable for your development application. For development that involves building or other works, the fee for your application is based on the estimated cost of the development.

If your application is for integrated development or requires concurrence from a state agency, additional fees will be required. Other charges may be payable based on the Council's adopted fees and charges. If your development needs to be advertised, the Council may charge additional advertising fees.

Once this application form is completed, it and the supporting documents will be submitted to the Council for lodgement, at which time the fees will be calculated. The Council will contact you to obtain payment. Note: When submitting documents via the NSW Planning Portal, credit card information should not be displayed on documents attached to your development application. The relevant consent authority will contact you to seek payment.

The application may be cancelled if the fees are not paid.

First name	Kim
Other given name(s)	
Family name	Avard
Contact number	[redacted]
Email address	
Billing address	[redacted]

Application documents

The following documents support the application.

Document type	Document file name
Cost estimate report	Cost Estimate
Other	5714_SEPP Koala_250722 5714_Modification_250828
Owner's consent	Signed Owner Consent
Preliminary Engineering Drawings	RFS_5714_Sheet 4_Vegetation Assessment_Lot 12 DP1245571 RFS_5714_Sheet 5_BFA - Slope Assessment RFS_5714_Sheet 3_Rural Fire Service Overlay 5714_Sheet 4_Plan of Proposed Subdivision of Lot 12 DP1244571_Aerial 5714_Sheet 2_ Plan of Proposed Subdivision of Lot 12 DP1244571 5714_Sheet 1_Proposed Plan of Subdivision of Lot 12 DP1244571 5714_Sheet 3_Building Envelopes
Stormwater Management Plan	5714_Stormwater Management Plan_Aug_2025

Applicant declarations

I declare that all the information in my application and accompanying documents is , to the best of my knowledge, true and correct.	Yes
I understand that the development application and the accompanying information will be provided to the appropriate consent authority for the purposes of the assessment and determination of this development application.	Yes
I understand that if incomplete, the consent authority may request more information, which will result in delays to the application.	Yes
I understand that the consent authority may use the information and materials provided for notification and advertising purposes, and materials provided may be made available to the public for inspection at its Offices and on its website and/or the NSW Planning Portal	Yes
I acknowledge that copies of this application and supporting documentation may be provided to interested persons in accordance with the Government Information (Public Access) 2009 (NSW) (GIPA Act) under which it may be required to release information which you provide to it.	Yes
I agree to appropriately delegated assessment officers attending the site for the purpose of inspection.	Yes
I agree to pay any required NSW Planning Portal Service Fee/s specified under Schedule 4 of the Environmental Planning and Assessment Regulation 2021 to the Department of Planning, Housing and Infrastructure.	Yes
I have read and agree to the collection and use of my personal information as outlined in the Privacy Notice	Yes
I confirm that the change(s) entered is/are made with appropriate authority from the applicant(s).	

Gunnedah Shire Council

Owners Consent

Made under the *Environmental Planning and Assessment Act 1979* and *Local Government Act 1993*

ABOUT THIS FORM

You can use this form to demonstrate that all owners have consented to the lodging of an application where Council is the consent authority.

LAND RELATING TO THE APPLICATION

Address: 229 Kamilaroi Road

Town/Suburb: Gunnedah State: NSW Postcode: 2380

Lot Number: 12, 115 and 108 Section Number: DP Number: 1244571 & 755503

OWNERS DETAILS

Name(s): Emerge Developments Pty Ltd

[redacted]

I/WE, THE OWNER(S) GIVE CONSENT TO

Nominated Agent: Stewart Surveys Pty Ltd

TO ACT ON MY/OUR BEHALF TO

- Lodge all relevant applications for development consent, CCs, CDCs, Subdivision Works Certificates, Subdivision Certificates, Appointment of Principal Certifier, Building Information Certificates, Occupation Certificates, Planning Proposal and Section 68 Applications.
- Have discussions with all relevant authorities.
- Do all things required to be done or provide all information and documents necessary to obtain such approvals.
- Where applicable, withdraw the application/s and obtain a refund of relevant fees paid.

CONSENT OF ALL OWNERS

As the owner(s) of the property, I/we consent to this application to apply for approval to carry out the development described herein and state that the information contained herein is, to the best of my/our knowledge, true and correct. I/we hereby give permission for Council authorised personnel to carry out inspections of the land and buildings as necessary for the purpose of assessing this application without prior notice of entry.

Name: George Avard (Corporation) Capacity: Director

Signature: G.M Avard Date: 8/8/2025

Name: Chris Avard (Corporation) Capacity: Director

Signature: Date: 8/8/2025

***Note:** If ownership is under a company/corporation name, please provide evidence that the signatory on the application has the authority to sign on behalf of the company, by providing authority on company letterhead.*

PO Box 63 (63 Elgin Street) Gunnedah NSW 2380
T +61 2 6740 2100 E council@gunnedah.nsw.gov.au
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28 August 2025
Our Ref: 5714

The General Manager
Gunnedah Council
63 Elgin Street
GUNNEDAH NSW 2380

Dear Sir,

APPLICATION TO MODIFY DEVELOPMENT CONSENT 2015/054.002
SUBDIVISION OF 2 INTO 25 LOTS
VERA CLOSE, GUNNEDAH

An application is made to modify development consent 2015/054.002 for the subdivision of 2 lots into 25 Lots at Vera Close Gunnedah. A previous modification to this consent was refused (2025/054.004) by council on the basis of the developers proposed stormwater management plan and other items raised by council. We believe following meetings with Planning and Infrastructure that the revised stormwater management plan presented in this modification is suitable to meet council's engineering guidelines. We have addressed each item raised in the notice of refusal below. It is requested that this application be reviewed and processed as quickly as possible giving the length of time that has lapsed since the original application for the modification to consent.

The modification includes the introduction of Lot 115 in DP755503 into the development for drainage of water. The water drains from this holding through Lot 108 in DP755503 via a natural water course. To accompany the application an updated stormwater management plan has been prepared which includes the installation of a concrete causeway on Kamilaroi Road opposite the outlet of the waterway on Lot 108 in DP755503.

It is proposed to remove the Building Envelopes from Lots on the low side of Vera Close, this was supported in the previously lodge modification by the Rural Fire Service. The building envelopes on proposed Lots 12 to 17 match the plan approved by the Rural Fire Service in the previous modification application. There is no change to the lot layout in this modification.

A State Environmental Planning Policy (Biodiversity & Conservation) 2021, report has been prepared by Stewart Surveys for the additional Lot 115 DP 755503.

Below we have addressed each of the reasons for Refusal as outlined in the Determination of Modification to Consent 2015/054.002, issued 11 December 2024.

The Section 4.55 (1A) Application to Modify Development Consent No. 2015/054.002

1.) Does not demonstrate compliance with Section 6.5 (d) of *Local Environmental Plan, 2012* – application did not contain necessary information to demonstrate that the proposed stormwater drainage method is adequate.

We believe the updated stormwater management plan with drains model screenshots demonstrates the stormwater drainage is adequate.

2.) Does not meet the objectives of controls of section 4.1 (3) of the *Gunnedah Local Environmental Plan, 2012 -Lot 108 DP755503 does not contain a lot area at the completion of the development works which would be equal to or greater than the minimum lot size shown on the Lot Size Map in relation to that land.*

We believe the proposal does meet this clause as it say "Any Lot resulting from a subdivision of land. Lot 108 is not resulting from a subdivision it will remain the same Lot and DP particulars following this subdivision with no changes to the boundaries.

3.) Does not contain an assessment which would enable Council to conducts an assessment in accordance with chapter 3 Koala Habitat Protection 2020 if the SEPP (Biodiversity and Conservation) 2021.

A State Environmental planning Policy (Biodiversity and Conservation) 2021 Assessment is included in this application.

4.) Does not demonstrate how the development would not have a negative impact on the natural, built and social environment within the immediate locality in accordance with Section 4.15(1)(b) of the *Environmental Planning and Assessment Act 1979,* regarding to the following matters:

a. The modification would result in unmanage impacts to the public road network, which may result in a reduced service delivery from the local road authority.
b. The development was not accompanied by a Stormwater Management Plan which demonstrated that stormwater can be appropriately intercepted and drained to mitigate stormwater impacts to adjoining and downslope properties.

We believe the updated stormwater management plan meets the requirements of section 4.15(1)(b) of the EP&A Act 1979 as discussed with council staff in meetings regarding the revised stormwater proposal for this development.

5.) Does not comply with the development controls within 5.1 Lot Size of the *Gunnedah Development Control Plan 2012* and no variation was sort or granted.

GDCP 2012 has been repealed by GDCP 2025. There are no Lot Size controls in the current DCP.

6.) Does not contain sufficient information required to demonstrate compliance with 5.5 Stormwater Drainage of the *Gunnedah Development Control Plan 2012.* The information was deficient regarding the following matters:

a. The Stormwater Management Plan has not yet been provided to Council's satisfaction to comply with Gunnedah Shire Council Engineering Guidelines for Subdivision and Developments or Australia Rainfall and Runoff, including containing the 100 year ARI within the proposed stormwater system;

b. The applicant has not provided calculation and a management plan for proposed Stage 3 stormwater management;
c. The Stormwater Management Plan does not include detailed drawing or calculations for the Detention Basins;
d. The Stormwater Management Plan is expected to result in ongoing cost liability and public safety risks due to possible stormwater impact and damage to the road surface at the crossing of Kamilaroi Road.

We believe the updated Stormwater management plan addresses these requirements. Detailed drawings for the detention basins are part of the construction certificate application, and we believe the information provided in plans and sections demonstrates the stormwater proposed works at a DA level.

7.) Does not comply with the development controls within 5.11 Staged Subdivision of the *Gunnedah Development Control Plan 2012,* as no stormwater design for Stage 3 was provided.

There is no stage 3 in the current proposal. The stormwater calculations cover all of the remaining development.

8.) has not demonstrated how, in accordance with Section 4.15(1)(c) of the *Environmental Planning and Assessment Act 1979,* the development site is suitable for the development due to stormwater management and impacts to the road network.

The revised proposal includes a concrete causeway to mitigate impacts on the Kamilaroi Road network.

9.) does not include works that would ensure the development complies with the *Gunnedah Shire Council Engineering Guidelines for Subdivisions and Developments 2013,* with reference to open channels being required to cross a formed road via culverts

The revised documents include a concrete causeway in accordance with the engineering guidelines.

Gunnedah Local Environmental Plan, 2012

There are no changes to the subdivision lot layout as part of this modification, only the introduction of the two additional lots for stormwater drainage and removal of the building envelopes on the downhill lots. Therefore, we do not believe there are any additional section of the Gunnedah Local Environmental Plan, 2012 to be addressed. Clause 4.1 is addressed.

Gunnedah Development Control Plan, 2025

The following table addresses the DCP2025 and how any changes to the development comply noting that there is no change to the 1.2ha lot layout originally approved under the Gunnedah Development Control Plan, 2012.

Table No: Gunnedah DCP 2012 – Part G Subdivision– All Development			
Clause No.	Objectives/Strategies	Assessment	Consistency (Y/N/NA)
G.1. Lot orientation			
G.1. Controls	a. Lot size, shape and orientation is to provide optimal opportunity of passive solar design of future buildings.	No changes to the lot size, shape or orientation in this development.	Not applicable
	b. Lots are to be orientated north/south in urban areas. Building envelopes on larger lots or in rural areas are to be of sufficient size and orientation to allow construction of a building with a north/south orientation.		
	c. New roads are to be aligned east-west and north-south wherever possible.	No changes to originally approved road design.	Not applicable
	d. Lots with east-west orientation may require, depending on lot size, to be widened to provide for optimal solar access and to prevent overshadowing of buildings and private open space on adjoining lots.	No changes to the originally approved lot layout.	Not applicable
	e. Design of lots on sloping sites will be required to: i. minimise the need for boundary retaining walls ii. minimise the potential for overlooking of adjoining properties and iii. maintain solar access.	No changes to the originally approved lot layout.	Not applicable

Clause No.	Objectives/Strategies	Assessment	Consistency (Y/N/NA)
G.2. Subdivision Design			
G.2. Controls	a. The depth of the lot shall not exceed the width of the lot by more than 5:1.	No changes to the originally approved lot layout.	Not applicable
	b. For lots in cul-de-sacs, the frontage shall be sufficient to enable the proposed dwellings to address the street.		
	c. Public road access is required to all lots. A right of way will generally not be supported as the primary access in lieu of access to a public road.		
	d. Access should be from the lowest order road and where possible a		

	new road should be created for purposes of access.		
	e. The subdivision design shall accommodate the retention of significant trees and vegetation.	No Additional tree removal proposed	Not applicable
Battle-axe blocks	f. Battle-axe blocks shall comply with the following controls: i. Within the R2, R3 and RU5 zones, access handles shall be a minimum width of 5m, of which 3m is to be constructed and sealed with reinforced concrete, asphaltic concrete or interlocking pavers prior to the issue of the subdivision certificate. ii. Within all other zones, the minimum width of a handle is 15m, with a maximum length of 200m. iii. The topography of the site may require installation of kerbing to manage overland stormwater.	No changes to the originally approved lot layout.	Not applicable
	g. Cul-de-sacs will generally not be supported on mapped as bushfire prone land.		
Industrial Lots	h. Industrial lots shall have a minimum street frontage and square width of 24m and a minimum area of 100m^2.	The development is not an industrial lot	Not applicable

Clause No.	Objectives/Strategies	Assessment	Consistency (Y/N/NA)
G.3. Roads			
G.1. Controls	a. An assessment of potential traffic impacts is to include an assessment of the proposed subdivision and its impacts on the adjacent existing road network. For development involving more than 5 lots, a detailed Traffic Impact Assessment is to be submitted with the development application.	No changes to originally approved road design.	Not applicable
	b. The road hierarchy shall be defined according to Gunnedah Shire Council Engineering Design Minimum Standards.		
	c. Road network design shall include consideration of vehicular, pedestrian and cyclist safety.		
	d. Residential subdivision must incorporate appropriate facilities and opportunities for pedestrian and bicycle movement and include		

	shared paths and street tree planting.		
	e. The alignment, width and design standard for all roads shall be in accordance with the expected traffic volume, type of traffic and desired speed in accordance with Council's Engineering Design Minimum Standards.		
	f. Kerb and gutter is required for subdivision where the Lot Size Map specifies a minimum lot size of up to and including 3000m^2.		
	g. Sealed pavement will be required where the Lot Size Map specifies a minimum lot size of up to and including 10 hectares (this does not relate to RU5 village zone).		
	h. A road within a residential subdivision in R2 and R3 zone must include a constructed shared path (minimum width of 2.5m).		
	i. Subdivision layouts shall make provision for road connection to adjoining undeveloped land.		
	j. Roads are to be designed having regard to both topography of the site and the requirements of stormwater overland flow paths.		
	k. Roads within the E4 and E5 land zones shall be in accordance with Council's Engineering Design Minimum Standards, including sealed wearing course and full kerb and guttering along all frontages.		
Garbage collection	l. Road design must accommodate the legal movement of garbage collection vehicles.	No changes to originally approved road design.	Not applicable
	m. Allotments are to allow for placement of garbage bins within the alignment of that lot.		
	n. In staged subdivisions temporary turning facilities shall be provided to facilitate garbage collection services.		

Clause No.	Objectives/Strategies	Assessment	Consistency (Y/N/NA)
G.4. Street trees in urban zones			
G.4. Controls	a. Street trees shall be provided at a rate of one tree per allotment.	There Is no change to the proposed lot configuration and no street trees were required or installed in stage 1 therefore we don't believe this is triggered in the modification	Not applicable
	b. Street trees shall be planted no closer than 900mm to the kerb, clear of driveways and underground services.		
	c. Advanced trees shall be planted and maintained by the developer for at least 12 months, any trees that fail to thrive shall be replanted immediately.		
	d. Species shall be selected from Council's Street Tree Strategy that are drought, frost and disease tolerant with minimum maintenance requirements upon maturity.		
	e. Spacing and size should be appropriate for the scale of the neighbourhood, building setbacks and width of road pavement, width of the verge, location of infrastructure including power, and stormwater and location of driveways. Generally, the following spacing shall apply: i. Small trees – 5-7 metres; ii. Medium trees – 7-10 metres.		

Clause No.	Objectives/Strategies	Assessment	Consistency (Y/N/NA)
G.5. Servicing strategy			
G.5. Controls	All development applications shall provide a servicing strategy (water, sewer, stormwater, telecommunications and electricity).	The proposed development is provided with an updated Stormwater Management Plan, no other services vary from the original site services strategy approved for this development	Yes
	For all new estates this shall include nomination of a maximum number of equivalent tenements that will be serviced by the infrastructure.	13 ETs apply	Yes
	Development applications for subdivision or major development are to consider the timing and staging of infrastructure provision including:	No change to the originally approved staging of this development.	Not applicable

	» Demonstrating that water and sewerage reticulation is able to be provided having regard to Gunnedah Shire Council water mains and sewer servicing strategy. » Forward funding of any infrastructure developer contributions ahead of Council's program of works.		
	All lots are to be provided with water and sewer connections suitable for the intended development where existing infrastructure is located within reasonable proximity.	No Changes to the water or sewer servicing approved for this development	Not applicable
G.5.1. Water	a. The servicing strategy shall identify the method of providing water to the proposed lots in accordance with Engineering Design Minimum Standards.	No Changes to the water or sewer servicing approved for this development	Not applicable
	b. Reticulated water is to be supplied to subdivision where the Lot Size Map specifies a minimum lot size of up to and including 1.2 hectares.		
G.5.2. Sewer	a. The servicing strategy shall identify the method of providing sewer to the proposed lots in accordance with Engineering Design Minimum Standards.	No Changes to the water or sewer servicing approved for this development	Not applicable
	b. Detail of any lot filing required to achieve minimum grade shall be provided.		
	c. Reticulated sewer is required where the Lot Size Map specifies a minimum lot size of up to and including 3000m2.		
	d. On site sewerage management systems will be required when development lots where the Lot Size Map specifies a minimum area of 1 hectare or greater.		
G.5.3. Stormwater Design	a. A servicing strategy shall be provided in accordance with Gunnedah Shire Council's Engineering Design Minimum Standards.	We have enclosed a stormwater management plan in accordance with the GSC Engineering Guidelines	Yes
G.5.4. Telecommunications & electricity	a. The telecommunications must be provided to the boundary of all lots in the subdivision at the full cost of the developer.	No changes to the telecommunication or electricity design for this development	Not applicable

	b. The subdivision is to be serviced by underground electricity where the Lot Size Map specifies a minimum lot size of up to and including 9.9 hectares.		
	c. For subdivision of land where the Lot Size Map specifies a minimum lot size of greater than 9.9 hectares and less than 40 hectares, electricity supply is required and may be overhead.		
	d. For subdivision of land where the Lot Size Map specifies a minimum lot size of 40 hectares or greater, no connection to electricity is specified.		
	e. Alternate arrangements to mains power may be acceptable in exceptional circumstances, where detailed solar report is provided.		
	f. Council will consider alternative solutions for the provision of services on lots in the RU1, RU4 RU6 and C3 zones where the application can demonstrate that physical connection is not practical.		

We believe the proposed changes in the subdivision layout comply with the requirements for the Gunnedah DCP 2025.

The following plans has been updated to show the changes outlined in this modification:

Stormwater Management Plan, development application Merrilands Heights – Vera Close, Gunnedah Lot 12 in DP1244571, prepared by Stewart Surveys Pty Ltd, dated July 2025 (ver 4) ref. 5714.

State Environmental Planning Policy (Biodiversity and Conservation) 2021, Development Application 229 & 323 Kamilaroi Road, Gunnedah, prepared by Stewart Surveys Pty Ltd, dated 31 July 2025, ref. 5714

Development Plans, prepared by Stewart Surveys Pty Ltd, Ref. 5714

Sheet 1 - Plan of Proposed Subdivision of Lot 12 in DP1244571, dated 5th August 2025

Sheet 2 - Plan of Proposed Subdivision of Lot 12 in DP1244571, dated 5th August 2025

Sheet 3 – Building Envelopes Plan of Proposed Subdivision of Lot 12 in DP1244571, dated 5th August 2025

Sheet 4 - Plan of Proposed Subdivision of Lot 12 in DP1244571 Aerial Photo Overlay

Bushfire Assessment Report prepared by Stewart Surveys Pty Ltd, Ref. 5714

There is no change to the asset protection zone or bushfire protection measures as part of this modification.

Sheet 1 - Plan of Proposed Subdivision of Lot 12 in DP1244571, dated 5th August 2025

Sheet 2 - Plan of Proposed Subdivision of Lot 12 in DP1244571, dated 5th August 2025

Sheet 3 – Rural Fire Service Overlay Plan of Proposed Subdivision of Lot 12 in DP1244571, dated 5th August 2025

Sheet 4 – Vegetation Assessment Plan of Proposed Subdivision of Lot 12 in DP1244571, dated 5th August 2025

Sheet 5 – BFA Slope Assessment Plan of Proposed Subdivision of Lot 12 in DP1244571, dated 5th August 2025

If acceptable to Council we request that condition A1a of DA Consent 2015/054.002, listing the approved documents is updated to reflect the above-mentioned plans. Note Stage 1 plans have been constructed and remain the same as the current DA approval.

Original Wording Condition A1a

A1a. The proposed development shall be carried out generally in accordance with the details set out in the following

- *Development Application form lodged 22/06/2015*
- *Statement of Environmental Effects, prepared by Kathryn Yigman, dated February 2015;*
- *Letter dated 30 July 2015; Ref: 4214; & dated 3 September 2015, Ref: 4214;*
- *Letter, prepared by Stewart Surveys Pty Ltd, dated 8 August 2018, ref: 4214; &*
- *Submitted Plans:*
    - *Prepared by Stewart Surveys, dated 29 January 2015, Ref: 4214, Sheet 1 (Subdivision Plan); dated: January 2015, Sheet 2 (Plan of Subdivision), Sheet 3 (Building Envelopes), Sheet 5 (Vegetation Assessment), Sheet 6 (Vegetation Assessment), Sheet 7 (Soil Assessment); & dated August 2018, Ref: 4214, Sheet 4 (Plan of Subdivision), Sheet 3 (Rural Fire Service Overlay); & dated 1 August 2018, Ref: 5068, Proposed Lot 5;*
- *Supporting Documents;*
    - *Site Services Strategy, prepared by Kathryn Yigman, dated February 2015, Ref: 4214;*
    - *Traffic Impact Assessment, prepared by Kathryn Yigman, dated February 2015, Ref: 4214;*
    - *Bushfire Assessment Report, prepared by Kathryn Yigman, dated February 2015, Ref 4214;*

Except as otherwise provided by the conditions of consent

Proposed Condition A1b

A1b. The proposed development shall be carried out generally in accordance with the details set out in the following

- *Development Application form lodged 22/06/2015*
- *Statement of Environmental Effects, prepared by Kathryn Yigman, dated February 2015;*
- *Letter dated 30 July 2015; Ref: 4214; & dated 3 September 2015, Ref: 4214;*
- *Letter, prepared by Stewart Surveys Pty Ltd, dated 8 August 2018, ref: 4214;*
- *Application to modify development consent 2015/054.002, Subdivision of 2 into 25 lots Vera Close, Gunnedah, prepared by Stewart Surveys Pty ltd, dated 28/8/25, ref. 5714 &*
- *Submitted Plans:*
    - *Prepared by Stewart Surveys, dated 5 August 2025, Ref: 5714, Sheet 1 (Subdivision Plan); Sheet 2 (Plan of Subdivision), Sheet 3 (Building Envelopes), Sheet 4 (Aerial Photo Overlay) and ref: 4214 dated January 2015 Sheet 5 (Vegetation Assessment), Sheet 6 (Vegetation Assessment), Sheet 7 (Soil Assessment); & dated August 2018, Ref: 4214, & dated 1 August 2018, Ref: 5068, Proposed Lot 5;*
- *Supporting Documents;*

- *Site Services Strategy, prepared by Kathryn Yigman, dated February 2015, Ref: 4214;*
- *Traffic Impact Assessment, prepared by Kathryn Yigman, dated February 2015, Ref: 4214;*
- *Bushfire Assessment Report, prepared by Kathryn Yigman, dated February 2015, Ref 4214; and plans: Prepared by Stewart Surveys, dated 5 August 2025, Ref: 5714, Sheet 1 (Subdivision Plan); Sheet 2 (Subdivision Plan), Sheet 3 (Rural Fire Services Overlay), Sheet 4 (Vegetation Assessment); and Sheet 5 (Slope Assessment).*
- *Stormwater Management Plan, prepared by Stewart Surveys Pty Ltd, dated July 2025, ref. 5714*

Except as otherwise provided by the conditions of consent

Original Wording Condition B1a

B1a. The Development proposal is to comply with the subdivision layout identified on the following drawings prepared by Stewart Surveys Pty Ltd, except as modified by the conditions of this bush fire safety authority:

- *Plan of Proposed Subdivision (ref: 4214) – sheet 1 dated 29 January 2015;*
- *Plan of Proposed Subdivision (ref: 4214) – sheet 2 dated January 2015; and*
- *Rural Fire Service Overlay (ref: 4214) – sheet 3 dated August 2018.*

Proposed Condition B1b

B1b. The Development proposal is to comply with the subdivision layout identified on the following drawings prepared by Stewart Surveys Pty Ltd, except as modified by the conditions of this bush fire safety authority:

- *Plan of Proposed Subdivision (ref: 5714) – sheet 1 dated 5 August 2025;*
- *Plan of Proposed Subdivision (ref: 5714) – sheet 2 dated 5 August 2025; and*
- *Rural Fire Service Overlay (ref: 5714) – sheet 3 dated 5 August 2025.*

Original Wording Condition G6

G6. A caveat shall be placed on the title of each of the lots created by the subdivision of Lot 5, DP 1179687, requiring a compliance certificate under Section 306 of the Water Management Act, 2000 to be obtained, prior to the sale of the property or the commencement of any development works on the lot, whichever occurs first:

A compliance certificate under Section 306 of the Water Management Act, 2000 must be obtained from the Council (as the local water supply authority).

Note: Council requires the following payments to be completed prior to issuing a compliance certificate to allow continued funding of water and sewer facilities.

Water headworks contribution is $13,050 per lot.

The contributions are determined in accordance with the Development Servicing Plan for Gunnedah Shire Council Water Supply and Development Servicing Plan for Gunnedah Shire Council Sewerage commencing on 1 July 2012, a copy of which may be inspected at the office of the Council. The above contributions have been adopted under the Council's 2015/2016 Operational Plan. Revised rates adopted by Council in the subsequent Operational Plans will apply to lots released in later financial years.

All legal costs associated with the establishment and removal of the caveat shall be borne by the developer.

Our client wishes to remove the caveat and adopt the current DSP for the R5 zone. To effect this modification, we propose that condition G5 requiring a deed of Agreement is deleted and the following condition G6a be adopted.

Delete Condition G5

Proposed Condition G6a

A Compliance Certificate for each stage under Section 306 of the Water Management Act 2000 must be obtained from the Council (as the local water supply authority).
Note: Council requires the following contributions to be paid prior to issuing a compliance certificate to allow continued funding of water and sewer facilities.

▪ *$6,785.00 for Water headworks*

The contributions for each stage must be paid prior to the issue of a Subdivision Certificate.

The contributions are determined in accordance with the Development Servicing Plan for Gunnedah Shire Council Water Supply and Development Servicing Plan for Gunnedah Shire Council Sewerage commencing on 21 August 2025, a copy of which may be inspected at the office of the Council. The above contributions have been adopted under the Council's 2024/2025 Operational Plan. Revised rates adopted by Council in the subsequent Operational Plans will apply to lots released in later financial years.

It is proposed to remove the building envelopes from Lots 18 to 24 on the low side of Vera Close as they are not required for bushfire protection. It is therefore proposed to modify the wording of condition G7 as follows:

Existing Condition G7

A restriction as to User, pursuant to Section 88B of the Conveyancing Act 1988 is to be submitted for Lots 1-24 to locate all buildings within the building identified on the submitted plan prepared by Stewart Surveys, dated January 2015, Ref 4214, Sheet 3 (Building Envelopes).

Proposed Condition G7a

A restriction as to User, pursuant to Section 88B of the Conveyancing Act 1988 is to be submitted for Lots 1-17 to locate all buildings within the building envelope identified on the submitted plan prepared by Stewart Surveys, dated 5 August 2025, Ref 4214, Sheet 3 (Building Envelopes).

We do not believe that these changes to the proposed layout to modify the stormwater management plan will result in any greater impacts at the surrounding sensitive receivers or any greater impact on the environment. We believe this modification is generally the same as the original application which was granted approval for the subdivision of two (2) lots into twenty five (25) lots.

This modification is considered to be a type 1A modification under the *Environmental Planning and Assessment Act 1979 No 203,* clause 4.55.

A 1A modification involves minimal environmental impact. This clause states that a consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:

(a) it is satisfied that the proposed modification is of minimal environmental impact, and

(b) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which the consent was originally granted and before that consent as originally granted was modified (if at all), and

(c) it has notified the application in accordance with:

(i) the regulations, if the regulations so require, or

(ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and

(d) it has considered any submissions made concerning the proposed modification within any period prescribed by the regulations or provided by the development control plan, as the case may be.

It is believed that this change to overall subdivision to remove building envelopes from Lots 18-24 and to redirect stormwater to existing contour banks, detention basins and waterways results in minimal additional environmental impacts and is substantially the same as the development which was originally granted consent.

With consent to this application, it is requested that condition numbers A1, B1, G6 and G7 are modified, as outlined in this letter and Condition G5 is deleted.

We enclose a owners consent form, a copy of the original consent, Updated Subdivision Plans as described and request council contact the landowner Kim Avard of Emerge Developments to make payment of the council's application fees.

[redacted]

If you have any queries regarding this application, please contact our office.

Yours faithfully
STEWART SURVEYS PTY LTD

Kathryn Stewart
Encl.

Stewart Surveys

DEVELOPMENT APPLICATION

State Environmental Planning Policy (Biodiversity & Conservation) 2021

Development Application
299 & 323 Kamilaroi Road, Gunnedah

File Reference: 5714
Date: 31 July 2025
Prepared For: Emerge Developments

REPORT PREPARATION

Name: **Kathryn Stewart**

Qualifications: Bachelor of Landscape Architecture (UNSW)
Masters of Environmental Management (UNSW)
Registered Landscape Architect (#001493)

Company: **Stewart Surveys Pty Ltd**
ABN: 65 002 886 508
PO Box 592, Gunnedah NSW 2380
(02) 6742 2966
office@stewartsurveys.com

This SEPP (Biodiversity and Conservation) 2021 Assessment report has been prepared by our office to accompany a council application. To the best of our knowledge, the content of this statement is true in all material particulars and does not, by its presentation or omission of information, materially mislead.

SITE PARTICULARS

Lot Particulars: **Lot 115 DP755503**

Address: **323 Kamilaroi Road, Gunnedah**

Local Government Area: **Gunnedah**

Report prepared for: **Emerge Developments**

Date: **31 July 2025**

STATE ENVIRONMENTAL PLANNING POLICY (BIODIVERISTY AND CONSERVATION) 2021

ASSESSMENT

Kathryn Stewart of Stewart Surveys has been engaged by Emerge Developments to prepare a report under the *State Environmental Planning Policy (Biodiversity Conservation) 2021* (hereafter referred to as *the SEPP*), to accompany a proposed modification to Development Application 2015.004. The proposal relates to land described as Lot 12 in DP1244571, Lot 108 DP 755503 and Lot 115 DP 755503, located at 299 and 323 Kamilaroi Road, Gunnedah.

The original Statement of Environmental Effects report included a SEPP 44 (Koala Habitat Protection) report covering Lot 662 DP723481 and Lot 680 DP39633 (now Lots 1 to 12 in DP1244571). This modification now introduces Lot 108 DP 755503 and Lot 115 DP 755503 into the development for stormwater drainage. A previous report under the SEPP (Biodiversity and Conservation) 2021 has already been prepared for Lot 108 DP 755503 and is included separately as part of this application. This report covers Lot 115 in DP755503.

The subject site is zoned RU1 – Primary Production under the *Gunnedah Local Environmental Plan 2012* and comprises an area of approximately 52 hectares.

This assessment considers the application of Chapters 1 to 13 of the *State Environmental Planning Policy (Biodiversity Conservation) 2021* to the proposed development.

This assessment covered the application of State Environmental Planning Policy (Biodiversity Conservation) 2021 (hereby referred to as SEPP) Chapters 1 to 13 to the development site.

This assessment is based on the information shown in the plans:

CHAPTER 2 – VEGETATION IN NON-RURAL AREAS

This chapter does not apply to land zoned RU1.

CHAPTER 3 – KOALA HABITAT PROTECTION 2020

The subject site is zoned RU1 Primary Production under the Gunnedah Local Environmental Plan, 2012. Therefore, State Environmental Planning Policy (Koala Habitat Protection) 2020 is applicable to this site. Gunnedah Shire Council is listed as containing Koala habitat under the SEPP. This policy states that for all land greater than 1 hectare in size, before Council may grant consent to an application to carry out development on land it must first determine whether or not the land is a potential koala habitat.

In the policy a potential koala habitat is defined as:

*"Areas of native vegetation where the trees listed in Schedule 2 of SEPP (Koala Habitat Protection) 2020 (*Table 1*) constitute at least 15% of the total number of trees in the upper and lower strata of the tree component".*

Scientific Name	Common Name
Eucalyptus tereticornis	Forest red gum
Eucalyptus microcorys	Tallowwood
Eucalyptus punctata	Grey Gum
Eucalyptus viminalis	Ribbon or manna gum
Eucalyptus camaldulensis	River red gum
Eucalyptus haemastoma	Broad leaved scribbly gum
Eucalyptus signata	Scribbly gum
Eucalyptus albens	White box
Eucalyptus populnea	Bimble box or poplar box
Eucalyptus robusta	Swamp mahogany

Table 1: List of SEPP – Schedule 2 preferred Koala Feed Trees

The subject site can be described as a cultivated cropping and grazing property with some scattered vegetation and dense forest in the south western corner of the site. The property is on highly fertile agricultural land. The land is vacant with improvements limited to fencing and water holding infrastructure. **Figure 1** is an aerial photo of the holding. This aerial photo along with site photo in **Figure 1** to **Figure 5** show the character and vegetation cover and site plan.

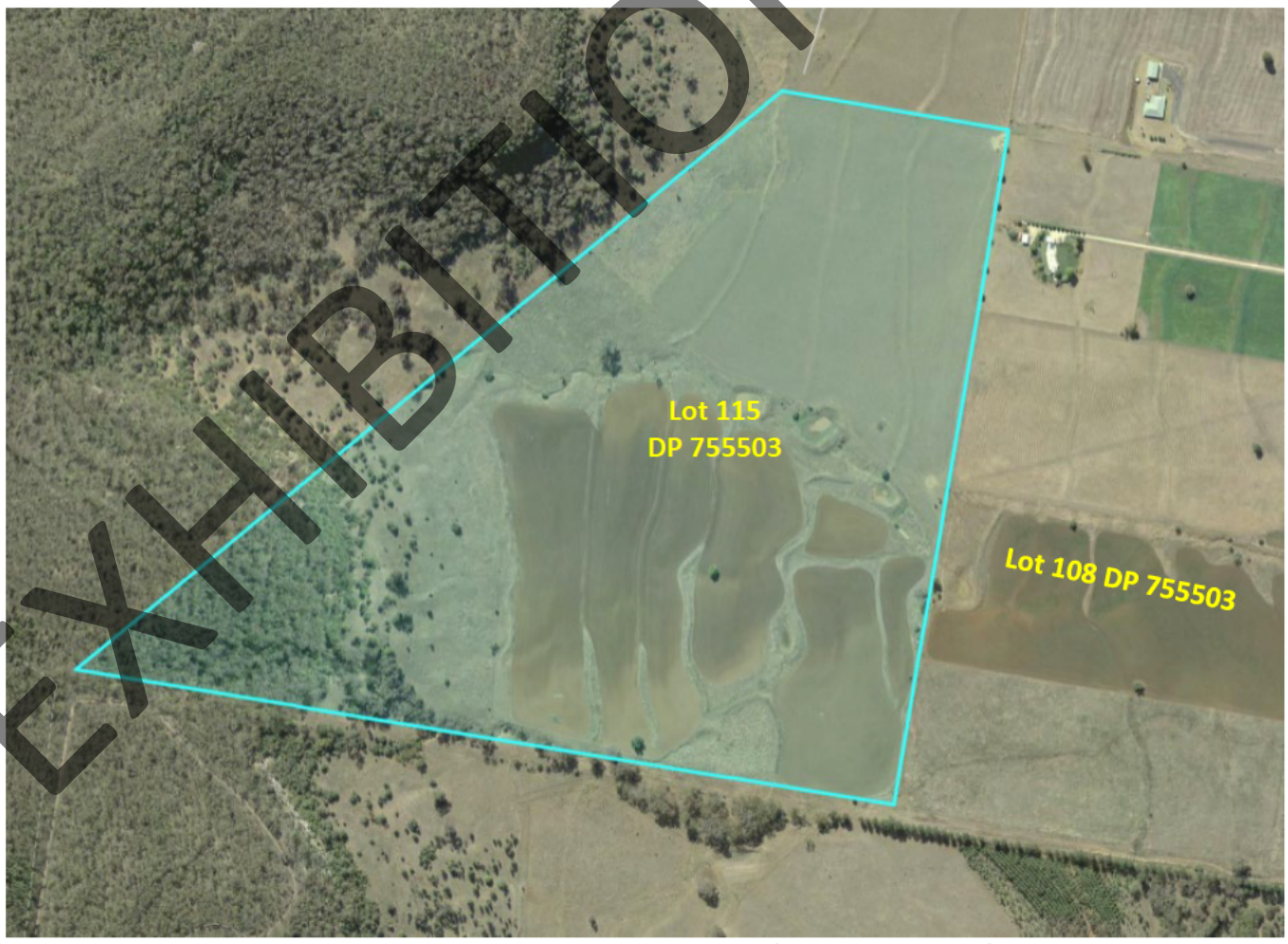

Figure 1: Aerial Photograph subject site (Source: Six Maps)

Figure 2: Site Photo looking west across Lot 115

Figure 3: Edge of dense tree section across south western section of the site

Figure 4: Edge of dense tree section across south western section of the site

Figure 5: View east across Lot 115

Desktop Review of Koala habitat

The subject site is mapped in the Gunnedah Koala Strategy endorsed by the Gunnedah Shire Council on 21 October 2015. The site is located within an area of high koala activity as shown in **Figure 6**. The trees in the south western corner of the site are identified as 2B secondary (class B) koala habitat. This type of habitat is able to support a koala population in low densities.

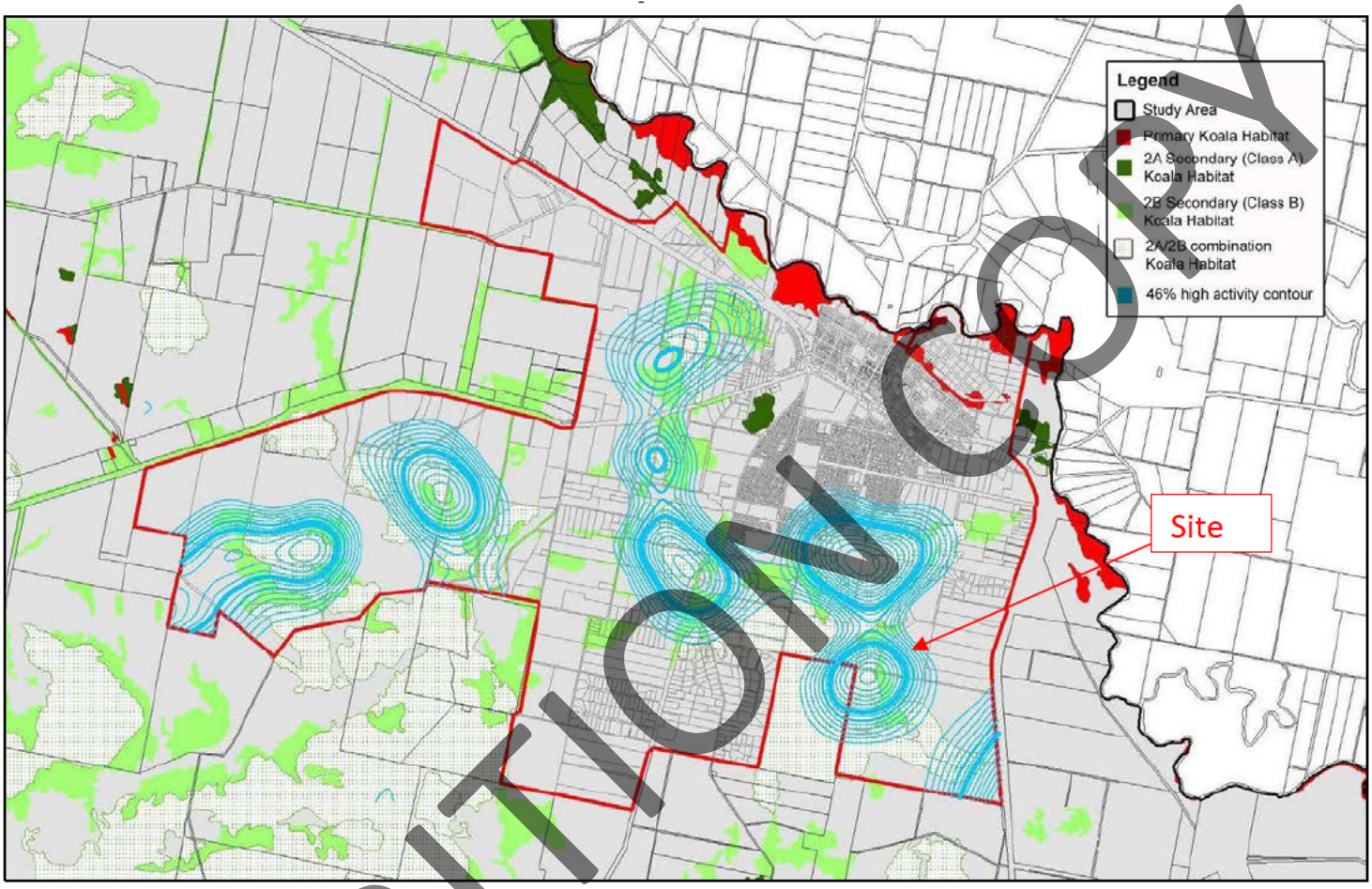

Figure 6: Koala Strategy Gunnedah Focus Area

A search of the NSW Office of Environment and Heritage Bionet Atlas of NSW Wildlife records 1,478 koala sightings in the Gunnedah LGA. A search of the area surrounding the site shows there are no Koala sightings recorded on the subject site between 1996 and 2006, however there are six (6) sightings of Koalas within a 5km radius of the site. The coordinates of the sightings are listed below in **Table 2**. **Figure 7** shows an extract from this search showing the site and surrounding koala sightings.

Table 2: Bionet Koala Sightings

Koala Sighting	Latitude	Longitude	Date	Distance from Site
1	-31.008747	150.256459	5 May 2021	731m south west
2	-31.008933	150.250679	31 August 2021	629m south west
3	-31.007472	150.264987	30 June 2006	1.2km north east
4	-31.007424	150.272444	9 June 2019	1.5km north east
5	-31.015801	150.266176	30 June 2006	1.2 km south east
6	-31.014611	150.273315	31 December 2004	1.5 km south east

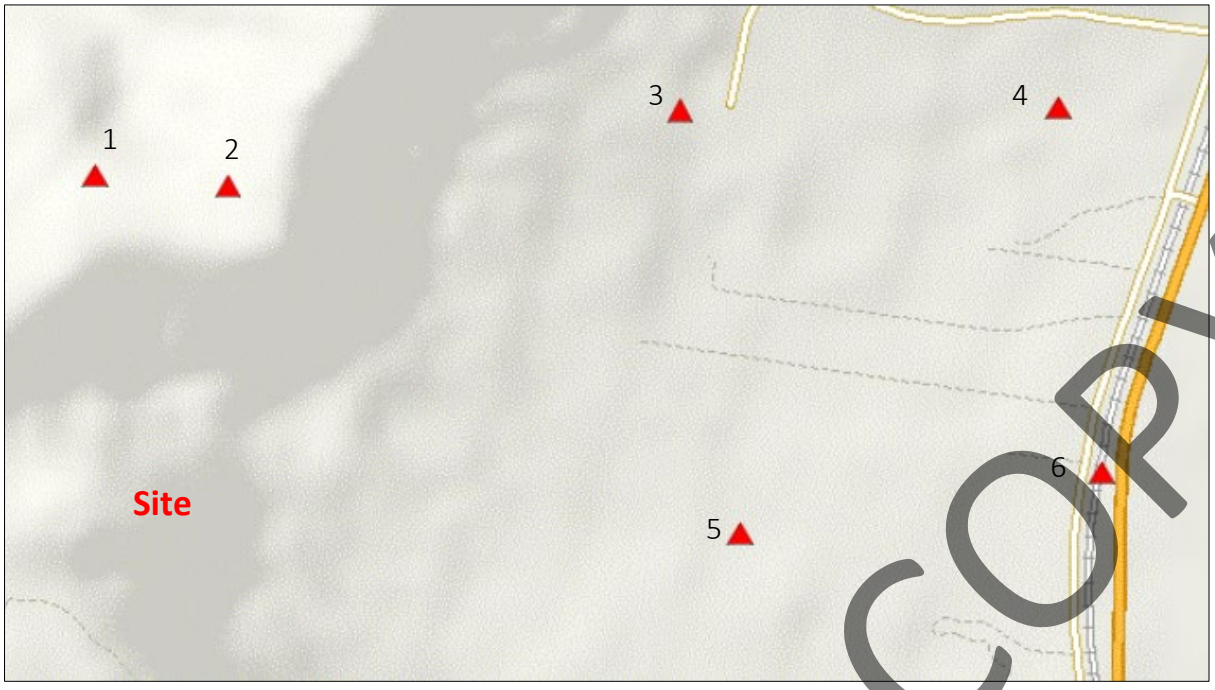

Figure 7: Atlas Map showing Koala sightings in the area (Bio Net Portal)

Site Investigation

This report is based on a site inspection carried out on 25th July 2025 by Kathryn Stewart of Stewart Surveys who meets the definition of a suitably qualified person to conduct the inspection under the SEPP.

The subject site is located five (5) kilometres south east of town of Gunnedah on the Kamilaroi Road. The site is an agricultural holding which includes cultivated oats and cattle grazing.

A desktop review of the vegetation on the site maps five (5) vegetation communities across the site, the vegetation community is described below, shown in **Figure 8**

- **PCT 0**: Non – Native Vegetation.
- **PCT 113:** Ooline closed forest (dry rainforest) on sandstone and conglomerate rises and hills in the Brigalow Belt South Bioregion.
- **PCT 433:** White Box grassy woodland to open woodland on basalt flats and rises in the Liverpool Plains sub-region, BBS Bioregion.
- **PCT 435:** White Box – White Cypress Pine shrub grass woodland in Brigalow Belt South Bioregion and Nandewar Bioregion.
- **PCT 592:** Narrow Leaved Ironbark – Cypress pine – White Box shrubby open forest in the Brigalow Belt South Bioregion and Nandewar Bioregion.

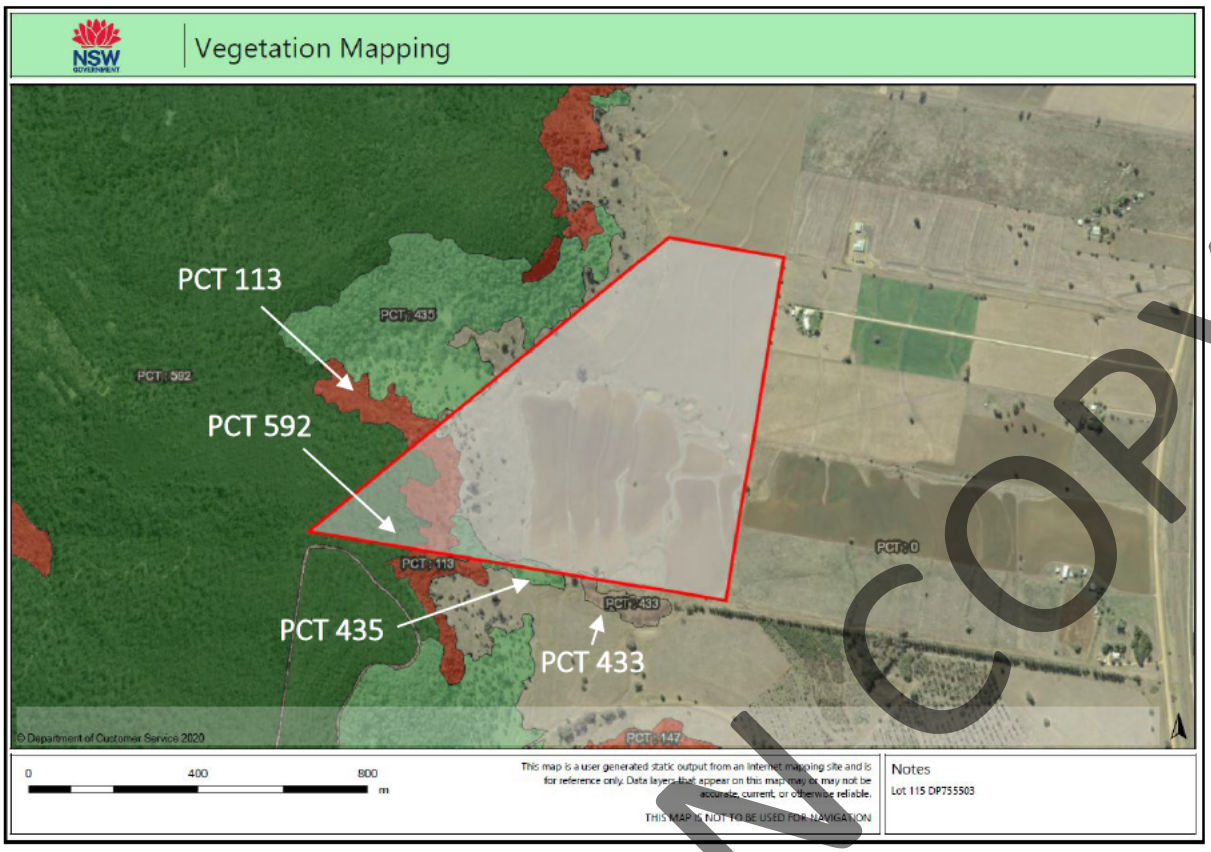

Figure 8: Vegetation Communities

These vegetation communities were verified on site. There was one Koala feed tree species, listed in schedule 1, Chapter 3 of SEPP (Biodiversity Conservation) 2021, identified in **Table 1** on the site. This tree was *Eucalyptus albens (White Box)*. This tree only occurred in the vegetation along the south-western corner of the property. The percentage of White box trees across the site is estimated to be 15-20% of the tree species makeup. Therefore, as the presence of Koala feed tree species is greater than fifteen percent (15%) the site is classified as potential Koala habitat under the SEPP.

Clause 3.6 (3) (b) states that if land is potential Koala habitat it must comply with section 3.7 of the SEPP, which requires an assessment to determine if the site is core Koala habitat.

Core Koala habitat is defined in SEPP 2020 as:

Core koala habitat *means an area of land with a resident population of koalas, evidenced by attributes such as breeding females, being females with young, and recent sightings of and historical records of a population.*

During the site inspection a sampling of *Eucalyptus albens*, Koala feed trees were inspected for evidence of Koala activity by means of scats at the base of the tree or scratch marks on the trunk. Trees were also inspected for the presence of a koala at the time of inspection. This sampling of trees was carried out using the random meander method. **Table 3** outlines the results.

Table 3: Site Observations of Koala Activity

Easting	Northing	Botanical Name	Common Name	Observations
238106	6565255	*Eucalyptus albens*	White Box	Nil
238104	6565253	*Eucalyptus albens*	White Box	Nil
238064	6565262	*Eucalyptus albens*	White Box	Nil

238058	6565266	*Eucalyptus albens*	White Box	Nil
238048	6565274	*Eucalyptus albens*	White Box	Nil
238042	6565283	*Eucalyptus albens*	White Box	Nil
238040	6565290	*Eucalyptus albens*	White Box	Nil
238030	6565301	*Eucalyptus albens*	White Box	Nil
238033	6565294	*Eucalyptus albens*	White Box	Nil
238040	6565288	*Eucalyptus albens*	White Box	Nil
238047	6565275	*Eucalyptus albens*	White Box	Nil
238076	6565257	*Eucalyptus albens*	White Box	Nil

There were no Koala's observed on the site and there was no evidence of recent activity in the Eucalyptus trees sampled across the subject site.

CONCLUSION

This assessment concludes the following:

- A site inspection on the 25th July 2025 by Kathryn Stewart did not encounter any koalas on the site, or evidence of scratch marking on the tree trunk and scats at the base, indicating past koala activity.
- Historical observations of koala activity showed no Koala's recorded on the subject site and the most recent listing within five (5) kilometers of the site in 2021 four years ago. There were only six (6) sightings in the past eighteen (18) years in the area.

Based on the above, it is concluded that the site is not considered to be currently supporting a resident population of koalas and therefore, is not considered to meet the definition of Core Koala Habitat under the SEPP.

The remainder of the development site is also not considered to be Core Koala Habitat as identified in the appended reports.

Under clause 3.7 of the SEPP if council is satisfied that the land is not Core Koala habitat, it is not prevented because of this chapter, from granting consent to the development application.

CHAPTER 4 – KOALA HABITAT PROTECTION 2021

This chapter does not apply to land zoned RU1

CHAPTER 5 - RIVER MURRAY LANDS

This chapter does not apply to land in the Gunnedah Shire.

CHAPTER 6 – BUSHLAND IN URBAN AREAS

This chapter does not apply to land in the Gunnedah Shire.

CHAPTER 7 – REPEALED

This chapter has been repealed and therefore does not apply to this report.

CHAPTER 8 – REPEALED

This chapter has been repealed and therefore does not apply to this report.

CHAPTER 9 – REPEALED

This chapter has been repealed and therefore does not apply to this report.

CHAPTER 10 – REPEALED

This chapter has been repealed and therefore does not apply to this report.

CHAPTER 11 – REPEALED

This chapter has been repealed and therefore does not apply to this report.

CHAPTER 12 –REPEALED

This chapter has been repealed and therefore does not apply to this report.

CHAPTER 13 –STRATEGIC CONSERVATION PLANNING

This chapter does not apply to this development.

CONCLUSION

We have conducted a full State Environmental Planning Policy (Biodiversity Conservation) 2021 assessment for the proposed subdivision development application. The only chapter which applies to this development is Chapter 3 – Koala Habitat Protection 2020 Our assessment concludes that there are no known impacts of proposed development which prohibit council from supporting this application.

Yours faithfully
STEWART SURVEYS PTY LTD

Kathryn Stewart
Registered Landscape Architect #001493
Bachelor Landscape Architecture (UNSW)
Masters of Environmental Management (UNSW)

REFERENCES

Department of Lands, *Spatial Information Exchange,* Available at [https://six.maps.nsw.gov.au/wps/portal/]. Abbreviated as DL SIX

New South Wales Government, *Gunnedah Local Environmental Plan 2012,* Available at [http://www.legislation.nsw.gov.au]

New South Wales Government Legislation, State Environmental Planning Policy (Koala Habitat Protection) 2021, Available at [https://legacy.legislation.nsw.gov.au/EPIs/2021-115.pdf]

Phillips, S. S. (2000) Tree species preferences of the Koala Phascolarctos cinereus as a basis for the delineation of management areas for recovery planning in New South Wales. Unpub. report to NSW National Parks and Wildlife Service/Koala Recovery Plan.

- PCT 113: Ooline closed forest (dry rainforest) on sandstone and conglomerate rises and hills in the Brigalow Belt South Bioregion.

- PCT 433: White Box grassy woodland to open woodland on basalt flats and rises in the Liverpool Plains sub-region, BBS Bioregion.

- PCT 435: White Box – White Cypress Pine shrub grass woodland in Brigalow Belt South Bioregion and Nandewar Bioregion.

- PCT 592: Narrow Leaved Ironbark – Cypress pine – White Box shrubby open forest in the Brigalow Belt South Bioregion and Nandewar Bioregion.

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BioNet Vegatation Classification - Community Profile Report

Plant Community Type ID (PCT ID): 113

PCT Name: Ooline closed forest (dry rainforest) on sandstone and conglomerate rises and hills in the Brigalow Belt South Bioregion

Classification Confidence Level: 2-High

Vegetation Description: Tall open forest dominated by Ooline (Cadellia pentastylis) with Belah (Casuarina cristata), White Cypress Pine (Callitris glaucophylla) and emergent eucalypts including White Box (Eucalyptus albens), Narrow-leaved Ironbark (Eucalyptus crebra), Pilliga Box (Eucalyptus pilligaensis) and Poplar Box (Eucalyptus populnea). Often grading into Green Mallee (Eucalyptus viridis) mallee low woodland. A mid-dense, sparse or dense shrub layer may be present containing inland "rainforest" genera including species such as Carissa ovata, Geijera parviflora, Alstonia constricta, Psydrax odorata, Capparis mitchellii and Notolaea microcarpa. Other shrubs include Eremophila mitchelli, Acacia deanei, Acacia buxifolia, Exocarpus aphyllus, Maireana microphylla, Olearia elliptica, Dodonaea viscosa subsp. angustifolia, Indigophora brevidens and Pimelea neo-anglica. The vines Pandorea pandorana subsp. pandorana or Jasminum lineare are usually abundant. The ground cover includes the low shrubs Spartothamnella juncea and Solanum parvifolium. Grasses include Aristida ramosa, Aristida calycina, Aristida gracilipes, Austrostipa verticillata, Sporobolus elongatus, Notodanthonia longifolia, Cymbopogon refractus and Poa sieberiana. Forb species include Einadia hastata, Einadia nutans subsp. nutans, Stackhousia muricata, Rostellularia adscendens subsp. adscendens, Arthropodium milleflorum, Vittadinia sulcata, Vittadinia pterochaeta, Swainsona galegifolia, Veronica calycina. Abutilon oxycarpum, Brunoniella australis and Boerhavia dominii. Occurs on a slightly acidic, friable, clayey sand or light brown loamy sand to light clay soils derived from quartz of lithic sandstone, lateritic gravel and conglomerate substrates on various aspects and landform elements including hillcrests, footslopes and gentle hillsides at about 400 m elevation in the Brigalow Belt South Bioregion from Gunnedah in the south to near North Star in the north. The known southern limit is Black Jack Mountain near Gunnedah with a large area on Turkey Ridge 30 km south/east of Narrabri. Populations occur in Deriah CCAZ2 (AA) reserve and along Eulah Creek south east of Mt Kaputar, near Terry Hie Hie and around Gravesend in the north. A similar community on claystone occurs near the Queensland border (ID114) and extends into Queensland. This is a naturally restricted community with more than half cleared and most areas grazed. Listed as an endangered ecological community in NSW.

Variation and Natural Disturbance: Ooline has survived the drying out of inland Australia at least partly though the adaptation of coppicing after disturbance. It flowers and seeds spasmodically but its requirements for seedling establishment have not been studied as of 2009.

Vegetation Formation: Rainforests;

Vegetation Class: Western Vine Thickets;

IBRA Bioregion(s): Brigalow Belt South; Nandewar;

IBRA Sub-region(s): Kaputar; Liverpool Plains; Northern Basalts; Northern Outwash; Peel;

LGA: GWYDIR; MOREE PLAINS; NARRABRI;

Lithology: Quartz sandstone , Sandstone , Conglomerate

Landform Pattern: Low hills , Rises

Landform Element: Footslope , Gully , Hillcrest , Hillslope , Valley flat

Emergent species:

Upper Stratum Species: Cadellia pentastylis; Casuarina cristata; Eucalyptus pilligaensis; Eucalyptus albens; Callitris glaucophylla; Eucalyptus populnea subsp. bimbil; Eucalyptus melanophloia; Eucalyptus viridis; Ventilago viminalis; Eucalyptus crebra; Alectryon subdentatus;

Mid Stratum Species: Carissa ovata; Notelaea microcarpa var. microcarpa; Eremophila mitchellii; Psydrax odorata; Capparis mitchellii; Acacia deanei subsp. deanei; Alstonia constricta; Ehretia membranifolia; Dodonaea viscosa subsp. angustifolia; Dodonaea viscosa subsp. cuneata; Indigofera brevidens; Phyllanthus subcrenulatus; Breynia cernua; Beyeria viscosa; Pimelea neo-anglica; Maireana microphylla; Olearia elliptica subsp. elliptica; Geijera parviflora; Olearia canescens; Acacia buxifolia subsp. buxifolia; Exocarpos aphyllus; Santalum acuminatum; Pandorea pandorana subsp. pandorana; Jasminum lineare; Dodonaea sinuolata subsp. sinuolata; Abutilon oxycarpum; Pittosporum spinescens; Rhagodia parabolica;

Ground Stratum Species: Solanum parvifolium; Spartothamnella juncea; Cyperus gracilis; Einadia hastata; Einadia nutans subsp. nutans; Cheilanthes distans; Carex inversa; Poa sieberiana; Aristida gracilipes; Austrostipa ramosissima; Notodanthonia longifolia; Setaria paspalidioides; Sporobolus elongatus; Digitaria ramularis; Austrodanthonia racemosa var. obtusata; Chloris truncata; Aristida calycina var. calycina; Aristida ramosa; Stackhousia muricata; Rostellularia adscendens var. adscendens; Arthropodium milleflorum; Vittadinia sulcata; Vittadinia pterochaeta; Swainsona galegifolia; Veronica calycina; Abutilon oxycarpum; Austrostipa verticillata; Chenopodium melanocarpum; Phyllanthus virgatus; Nyssanthes diffusa; Einadia trigonos subsp. leiocarpa; Chamaesyce drummondii; Brunoniella australis; Boerhavia dominii; Leptochloa peacockii; Eragrostis megalosperma; Cymbopogon refractus;

Diagnostic Species:

Fire Regime: Intense fire is likely to kill Cadellia trees due limited protection afforded to the cambiun in Cadellia. Fire history since the Pleistocene may help explain the fragmented occurrences of Ooline across the landscape. It is recommended that fire is excluded from this community.

TEC Assessed: Has associated TEC

TEC List: Listed BC Act,E: Cadellia pentastylis (Ooline) community in the Nandewar and Brigalow Belt South Bioregions (Part); Listed EPBC Act,E: Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions (Part);

TEC Comments:

PCT Percent Cleared: 60.00

PCT Definition Status: Approved

BioNet Vegatation Classification - Community Profile Report

Plant Community Type ID (PCT ID): 433

PCT Name: White Box grassy woodland to open woodland on basalt flats and rises in the Liverpool Plains sub-region, BBS Bioregion

Classification Confidence Level: 2-High

Vegetation Description: Tall to mid-high open woodland or woodland with trees dominated by White Box (Eucalyptus albens) occasionally with Kurrajong (Brachychiton populneus subsp. populneus) or the small tree Weeping Myall (Acacia pendula). Shrubs are absent or very sparse and include Acacia implexa, Sclerolaena birchii or Sclerolaena muricata var. muricata. The ground cover is dense with good sites containing a rich array of grasses and forbs - many of which also occur in the Liverpool Plains grasslands community (ID102). Grass species include Austrostipa aristiglumis, Austrodanthonia bipartita, Dichanthium sericeum subsp. sericeum, Themeda avenacea, Austrostipa bigeniculata, Enteropogon acicularis, Chloris ventricosa, Bothriochloa decipiens, Bothriochloa macra, Elymus scaber and Panicum buncei. Sedges include Carex inversa and Cyperus bifax. Forb species include Mentha satureioides, Boerhavia dominii, Asperula conferta, Plantago debilis, Dichondra repens, Rumex brownii, Chamaesyce drummondii, Eremophila debilis, Oxalis perennans, Euchiton sphaericus, Wahlenbergia communis, Vittadinia pterochaeta, Goodenia fascicularis, Sida corrugata, Einadia nutans subsp. nutans and Cullen tenax. Ground scramblers include Convolvulus graminetinus and Rhynchosia minima. Occurs on black earth to chocolate loam to clay soils that are often cracking, derived from basalt, on flats or low slopes in plains or low hill landform patterns predominantly in the Liverpool Plains IBRA sub-region from Boggabri in the north to Willow Tree in the south and Garawilla in the west. Occurs on slightly sloping land or flats on the edge of the original treeless plains. Grades into other White Box woodlands upslope on hillslopes such as grassy White Box hills woodland (ID434) or the White Box - White Cypress Pine woodland (ID435). Grades into and contains a similar ground cover floristic composition to ID102 Liverpool Plains grasslands and ID101 Poplar Box grassy woodland. Mostly cleared and cropped. A critically endangered plant community and NSW and Federally listed as part of the Grassy Box-Gum Woodland EEC.

Variation and Natural Disturbance: Shrubs are mainly absent or rare but some are present on steeper hills where the soil is better drained and shallow. The ground cover varies with land use history - cropping or grazing.

Vegetation Formation: Grassy Woodlands;

Vegetation Class: Western Slopes Grassy Woodlands;

IBRA Bioregion(s): Brigalow Belt South; Nandewar;

IBRA Sub-region(s): Liverpool Range; Liverpool Plains; Northern Basalts; Pilliga; Peel;

LGA: GUNNEDAH; LIVERPOOL PLAINS; NARRABRI;

Lithology: Alluvial loams and clays , Basalt

Landform Pattern: Low hills , Plain , Stagnant alluvial plain

Landform Element: Footslope , Hillcrest , Hillslope , Plain

Emergent species:

Upper Stratum Species: Eucalyptus albens; Acacia pendula; Brachychiton populneus subsp. populneus;

Mid Stratum Species: Sclerolaena birchii; Sclerolaena muricata var. muricata; Acacia implexa;

Ground Stratum Species: Austrostipa aristiglumis; Austrodanthonia bipartita; Mentha satureioides; Boerhavia dominii; Asperula conferta; Dichanthium sericeum subsp. sericeum; Themeda avenacea; Austrostipa bigeniculata; Chloris ventricosa; Plantago debilis; Elymus scaber var. scaber; Rumex brownii; Chamaesyce drummondii; Oxalis perennans; Euchiton sphaericus; Bothriochloa decipiens; Bothriochloa macra; Desmodium varians; Aristida leptopoda; Wahlenbergia communis; Rhynchosia minima; Vittadinia pterochaeta; Vittadinia muelleri; Einadia nutans subsp. nutans; Astrebla elymoides; Cullen tenax; Convolvulus graminetinus; Bothriochloa biloba; Enteropogon acicularis; Carex inversa; Cyperus bifax; Cyperus victoriensis; Epilobium billardiereanum subsp. cinereum; Goodenia fascicularis; Sida corrugata; Sida spinosa; Sida trichopoda; Teucrium sp. A; Elymus scaber var. scaber; Paspalidium jubiflorum; Panicum buncei; Geranium solanderi var. solanderi;

Diagnostic Species:

Fire Regime: Remnants rarely burns due to fragmentation and lack of ground cover. Originally may have been patch burnt by Aborigines.

TEC Assessed: Has associated TEC

TEC List: Listed BC Act,CE: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Part); Listed EPBC Act,CE: White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Part);

TEC Comments:

PCT Percent Cleared: 85.00

PCT Definition Status: Approved

BioNet Vegatation Classification - Community Profile Report

Plant Community Type ID (PCT ID): 435

PCT Name: White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
Classification Confidence Level: 2-High
Vegetation Description: Tall or mid-high woodland dominated White Cypress Pine (Callitris glaucophylla) and White Box (Eucalyptus albens) with Blakely's Red Gum (Eucalyptus blakelyi) of Kurrajong (Brachychiton populneus subsp. populneus) sometimes present. The shrub layer is sparse to dense depending on grazing pressure and includes Cassinia quinquefaria, Acacia implexa, Acacia penninervis var. penninervis, Geijera parviflora, Acacia implexa, Olearia elliptica subsp. elliptica, Dodonaea viscosa subsp. angustifolia, Oncinocalyx betchei, Cassinia arcuata and Geijera parviflora. The ground cover is mid-dense and includes grass species such as Aristida personata, Cymbopogon refractus, Themeda australia, Austrodanthonia racemosa var. racemosa, Austrostipa verticillata and Austrostipa scabra subsp. scabra. Forb species include Calotis lappulacea, Vittadinia sulcata, Einadia nutans subsp. nutans, Wahlenbergia communis, Dianella longifolia var. longifolia, Swainsona galegifolia, Dichondra sp. A and Daucus glochidiatus. The scramblers Desmodium brachypodum or Desmodium varians may be common. Occurs on red to brown clay to loamy sand soils derived from metamorphic or sedimentary substrates often with a volcanic (basalt) influence on hillslopes, hillcrests and gullies in low hills and hills landscape patterns mainly south of Boggabri to Coonabarabran and the footslopes of the Liverpool Range in the southern half of the NSW Brigalow Belt South Bioregion grading into the more shrubby ID588 on steeper hills mainly in the Nandewar Bioregion. Mostly cleared with minor representation in protected areas as of 2009.
Variation and Natural Disturbance: White Cypress Pine density varies depending on degree of regrowth and history of logging. In some locations Eucalyptus has been cut out. The understorey shrub density varies significantly with grazing - it is much denser in areas not grazed such as in conservation reserves.
Vegetation Formation: Dry Sclerophyll Forests (Shrub/grass sub-formation);
Vegetation Class: North-west Slopes Dry Sclerophyll Woodlands;
IBRA Bioregion(s): NSW South Western Slopes; Brigalow Belt South; Darling Riverine Plains; Nandewar;
IBRA Sub-region(s): Liverpool Plains; Inland Slopes; Northern Basalts; Northern Outwash; Pilliga Outwash; Pilliga; Liverpool Range; Talbragar Valley; Castlereagh-Barwon; Bogan-Macquarie; Kaputar; Peel;
LGA: WARRUMBUNGLE; WELLINGTON; NARRABRI; DUBBO; LIVERPOOL PLAINS; GUNNEDAH;
Lithology: Siltstone , Conglomerate , Sandstone , Tuff , Basalt
Landform Pattern: Hills , Low hills
Landform Element: Gully , Hillcrest , Hillslope
Emergent species:
Upper Stratum Species: Callitris glaucophylla; Eucalyptus albens; Eucalyptus blakelyi; Brachychiton populneus subsp. populneus; Angophora floribunda;
Mid Stratum Species: Cassinia quinquefaria; Olearia elliptica subsp. elliptica; Geijera parviflora; Dodonaea viscosa subsp. angustifolia; Acacia penninervis var. penninervis; Acacia implexa; Cassinia arcuata; Indigofera australis; Bursaria spinosa subsp. spinosa; Pimelea neo-anglica; Cassinia laevis; Melichrus urceolatus;
Ground Stratum Species: Aristida personata; Cymbopogon refractus; Desmodium brachypodum; Calotis lappulacea; Vittadinia sulcata; Einadia nutans subsp. nutans; Wahlenbergia communis; Austrostipa verticillata; Themeda australis; Dianella longifolia var. longifolia; Swainsona galegifolia; Austrostipa scabra subsp. scabra; Dichondra sp. A; Desmodium varians; Daucus glochidiatus; Oncinocalyx betchei; Austrodanthonia racemosa var. racemosa; Swainsona microphylla; Lomandra filiformis subsp. coriacea; Ajuga australis; Brunoniella australis; Panicum queenslandicum var. queenslandicum; Senecio prenanthoides; Senecio lautus subsp. dissectifolius; Einadia hastata; Vittadinia cuneata; Opercularia diphylla;
Diagnostic Species:
Fire Regime: Remnants rarely burns due to fragmentation and lack of ground cover. Areas may have been patch burnt by Aborigines.
TEC Assessed: Has associated TEC
TEC List: Listed BC Act,CE: White Box - Yellow Box - Blakely’s Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Part); Listed EPBC Act,CE: White Box-Yellow Box-Blakely’s Red Gum Grassy Woodland and Derived Native Grassland (Part);
TEC Comments:
PCT Percent Cleared: 58.00
PCT Definition Status: Approved

BioNet Vegatation Classification - Community Profile Report

Plant Community Type ID (PCT ID): 592

PCT Name: Narrow-leaved Ironbark - cypress pine - White Box shrubby open forestin the Brigalow Belt South Bioregion and Nandewar Bioregion
Classification Confidence Level: 3-Medium
Vegetation Description: Tall or mid-high open forest to woodland dominated by Narrow-leaved Ironbark (Eucalyptus crebra), White Cypress Pine (Callitris glaucophylla) and/or White Box (Eucalyptus albens). Other trees may include Tumbledown Red Gum (Eucalyptus dealbata) or Silver-leaved Ironbark (Eucalyptus melanophloia). There is usually a sparse shrubby understorey with Beyeria viscosa, Notelaea microcarpa var. microcarpa and Dodonaea viscosa subsp. angustifolia most frequent. Other shrubs include Breynia cernua, Solanum parvifolium, Melichrus urceolatus, Spartothamnella juncea and Psydrax oleifolia. The ground layer includes the sub-shrub Desmodium brachypodum and grass species such as Austrostipa scabra subsp. scabra, Austrodanthonia racemosa var. obtusata, Microlaena stipoides var. stipoides, Aristida ramosa and Cymbopogon refractus. Forb species include Dichondra species A, Calotis anthemoides, Vernonia cinerea var. cinerea, Brunoniella australis and Arthropodium sp. B. Climbers include Desmodium varians and Glycine clandestina. Occurs in loamy soils derived from volcanic or sedimentary substrates on hillslopes, footslopes and flats in hill landscape patterns mainly in the Mount Kaputar to Keepit Dam regions with outliers to the east and south of Mount Kaputar.
Variation and Natural Disturbance: Not assessed.
Vegetation Formation: Dry Sclerophyll Forests (Shrubby sub-formation);
Vegetation Class: Western Slopes Dry Sclerophyll Forests;
IBRA Bioregion(s): Brigalow Belt South; Nandewar;
IBRA Sub-region(s): Kaputar; Liverpool Plains; Northern Basalts; Peel; Pilliga; Nandewar Northern Complex;
LGA: GUNNEDAH; TAMWORTH REGIONAL; GWYDIR; NARRABRI;
Lithology: Tuff , Andesite , Gabbro , Volcanic breccia , Basalt , Claystone , Mudstone , Sedimentary rock (unidentified) , Limestone , Agglomerate , Conglomerate , Clay , Rhyolite , Sandstone
Landform Pattern: Hills
Landform Element: Footslope , Hillslope , Valley flat
Emergent species:
Upper Stratum Species: Eucalyptus crebra; Eucalyptus albens; Callitris glaucophylla; Eucalyptus melanophloia; Eucalyptus dealbata; Brachychiton populneus subsp. populneus; Alstonia constricta;
Mid Stratum Species: Beyeria viscosa; Olearia elliptica; Notelaea microcarpa var. microcarpa; Dodonaea viscosa subsp. angustifolia; Acacia leiocalyx subsp. leiocalyx; Breynia cernua; Solanum parvifolium; Melichrus urceolatus; Pimelea neo-anglica; Spartothamnella juncea; Psydrax oleifolia; Psydrax odorata; Maytenus cunninghamii; Cassinia laevis; Leptospermum microcarpum; Acacia deanei subsp. deanei; Clematis microphylla var. leptophylla; Marsdenia viridiflora subsp. viridiflora;
Ground Stratum Species: Austrostipa scabra subsp. scabra; Cymbopogon refractus; Desmodium brachypodum; Brunoniella australis; Dichondra sp. A; Cheilanthes sieberi subsp. sieberi; Calotis anthemoides; Austrodanthonia racemosa var. obtusata; Microlaena stipoides var. stipoides; Aristida ramosa; Cyperus gracilis; Aristida vagans; Notodanthonia longifolia; Vernonia cinerea var. cinerea; Arthropodium sp. B; Poa sieberiana; Aristida caput-medusae; Hypericum gramineum; Lomandra filiformis subsp. coriacea; Cheilanthes distans; Sigesbeckia australiensis; Sporobolus creber; Enneapogon gracilis; Leptochloa decipiens subsp. asthenes; Goodenia ovata; Glycine clandestina; Desmodium varians; Ajuga australis;
Diagnostic Species:
Fire Regime: No two fires within 15-20 year period, maintain most areas 30-50 years period (Hunter 2008g, Hunter 2008a). Occasional intervals greater than 25 years may be desirable (Kenny et al. 2003).
TEC Assessed: No associated TEC
TEC List:
TEC Comments:
PCT Percent Cleared: 52.00
PCT Definition Status: Approved

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DEVELOPMENT APPLICATION

LOT 108 DP 755503
299 KAMILAROI ROAD, GUNNEDAH

STATE ENVIRONMENTAL PLANNING POLICY (BIODIVERSITY AND CONSERVATION), 2021 ASSESSMENT

DATE: APRIL 2023

PREPARED FOR:
Emerge Developments

PREPARED BY:
Stewart Surveys Pty Ltd
107-109 Conadilly Street,
PO Box 592
GUNNEDAH NSW 2380
office@stewartsurveys.com

Stewart Surveys Reference: 5714

REPORT PREPARATION

Name:	**Kathryn Stewart**
Qualifications:	Bachelor of Landscape Architecture (UNSW) Masters of Environmental Management (UNSW) Registered Landscape Architect (#001493)
Company:	**Stewart Surveys Pty Ltd** ABN: 65 002 886 508 PO Box 592, Gunnedah NSW 2380 (02) 6742 2966 office@stewartsurveys.com

This SEPP (Biodiversity and Conservation) 2021 Assessment report has been prepared by our office to accompany a council application. To the best of our knowledge, the content of this statement is true in all material particulars and does not, by its presentation or omission of information, materially mislead.

SITE PARTICULARS

Lot Particulars:	**Lot 108 DP 755503**
Address:	**299 Kamilaroi Road, Gunnedah**
Local Government Area:	**Gunnedah**
Report prepared for:	**Emerge Developments**
Date:	**April 2023**

STATE ENVIRONMENTAL PLANNING POLICY (BIODIVERISTY CONSERVATION) 2021

ASSESSMENT

Kathryn Stewart of Stewart Surveys has been engaged by Emerge Developments to conduct a report under State Environmental Planning Policy (Biodiversity Conservation) 2021, (hereby referred to as SEPP) to accompany a Development Application for a proposed dwelling on Lot 108 DP 755503 at 299 Kamilaroi Road, Gunnedah.

The subject site is zoned RU1 Primary Production, the property has an area of approximately 20.3 hectares under the Gunnedah Local Environmental Plan, 2012.

This assessment covered the application of State Environmental Planning Policy (Biodiversity Conservation) 2021 (hereby referred to as SEPP) Chapters 1 to 12 to the development site.

This assessment is based on the information shown in the plans:

CHAPTER 2 – VEGETATION IN NON-RURAL AREAS

This chapter does not apply to land zoned RU1

CHAPTER 3 – KOALA HABITAT PROTECTION 2020

The subject site is zoned RU1 Primary Production under the Gunnedah Local Environmental Plan, 2012. Therefore, State Environmental Planning Policy (Koala Habitat Protection) 2020 is applicable to this site. Gunnedah Shire Council is listed as containing Koala habitat under the SEPP. This policy states that for all land greater than 1 hectare in size, before Council may grant consent to an application to carry out development on land it must first determine whether or not the land is a potential koala habitat.

In the policy a potential koala habitat is defined as:

*"Areas of native vegetation where the trees listed in Schedule 2 of SEPP (Koala Habitat Protection) 2020 (**able 1**) constitute at least 15% of the total number of trees in the upper and lower strata of the tree component".*

Scientific Name	Common Name
Eucalyptus tereticornis	Forest red gum
Eucalyptus microcorys	Tallowwood
Eucalyptus punctata	Grey Gum
Eucalyptus viminalis	Ribbon or manna gum
Eucalyptus camaldulensis	River red gum
Eucalyptus haemastoma	Broad leaved scribbly gum
Eucalyptus signata	Scribbly gum
Eucalyptus albens	White box
Eucalyptus populnea	Bimble box or poplar box
Eucalyptus robusta	Swamp mahogany

Table 1: List of SEPP – Schedule 2 preferred Koala Feed Trees

The subject site can be described as a cultivated cropping and grazing property with very few trees. The property is on highly fertile agricultural land. **Figure 1** is an aerial photo of the holding. This aerial photo along with site photo and Site plan showing proposed residence in ***Figure 1*** to **Figure 5** show the character and vegetation cover and site plan.

Figure 1: Aerial Photograph subject site (Source: Six Maps)

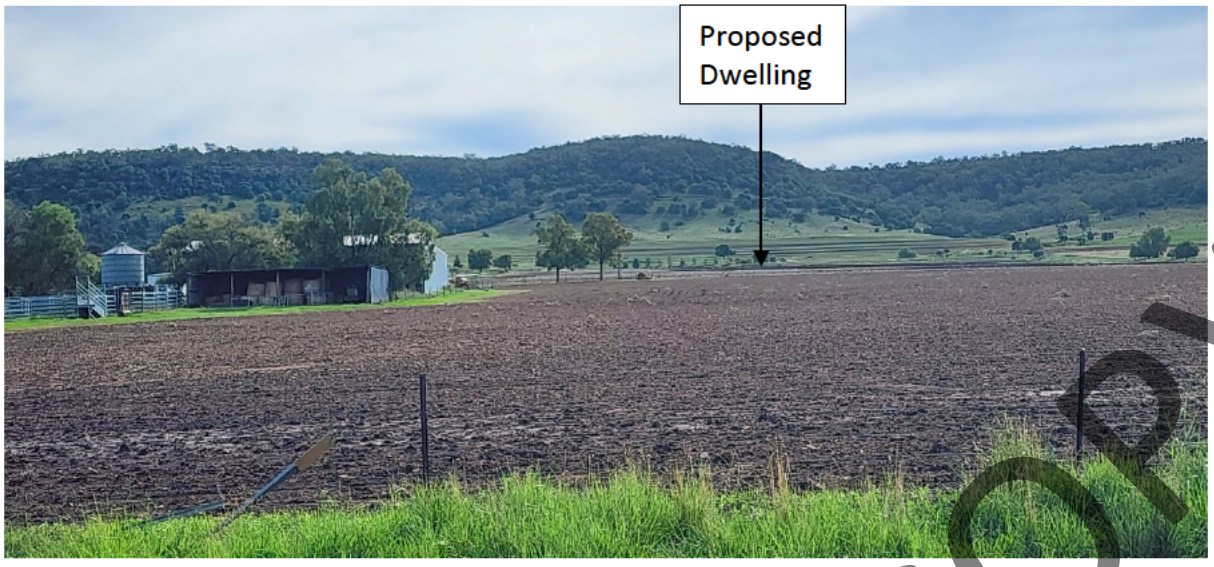

Figure 2: Site Photo showing dwelling location

Figure 3: Site Photo showing Wilga trees around the outbuildings

Figure 4: Site Photo showing cultivation and three Yellow Box Trees.

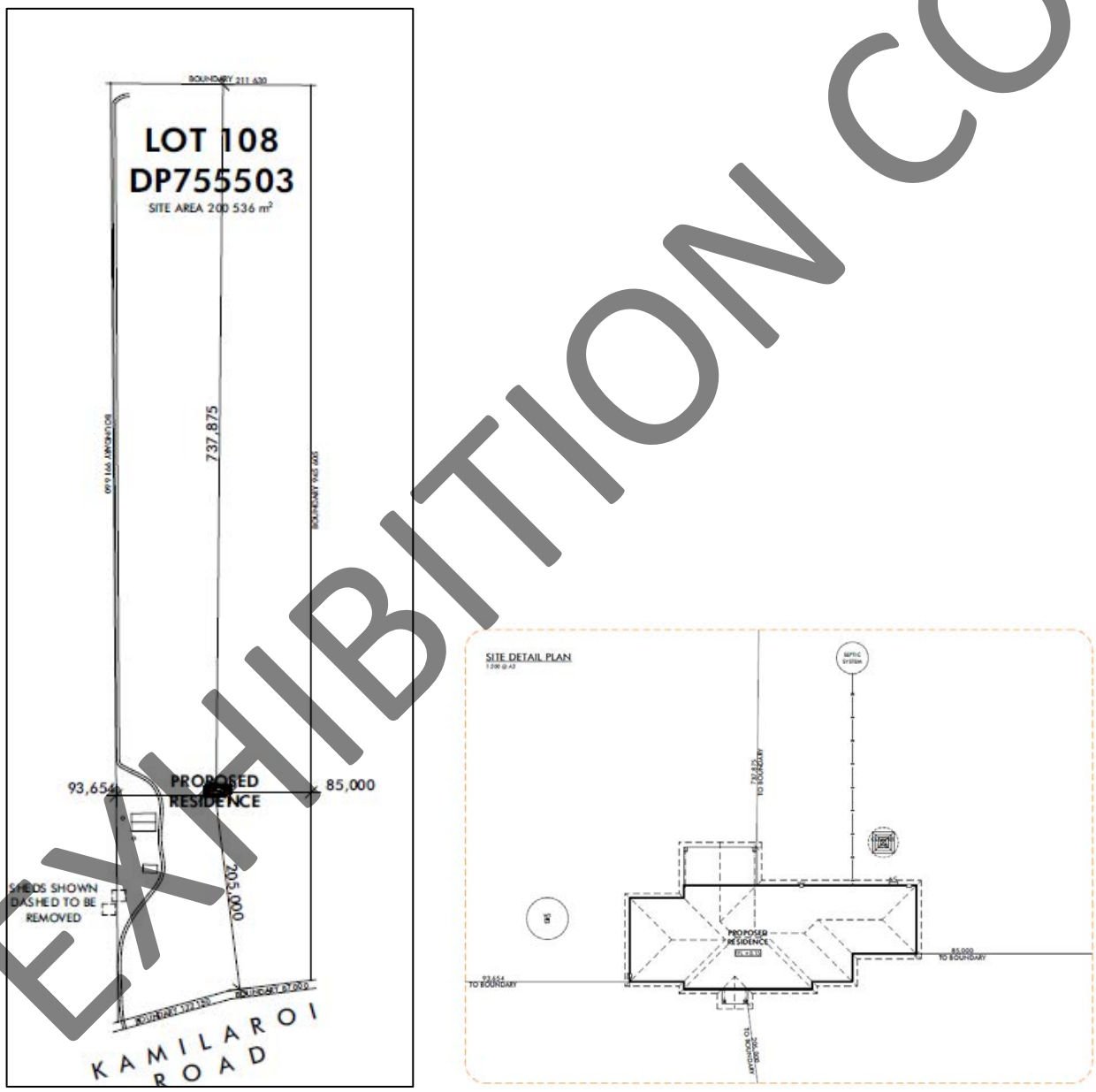

Figure 5: Site Plan (Single Builders)

Desktop Review of Koala habitat

The subject site is mapped in the Gunnedah Koala Strategy endorsed by the Gunnedah Shire Council on 21 October 2015. The site is located within the study area as shows in **Figure 6**, Koala habitat marked is not marked on the site, however there is close proximity to the high activity corridor at the rear of the site to the west and neighbouring.

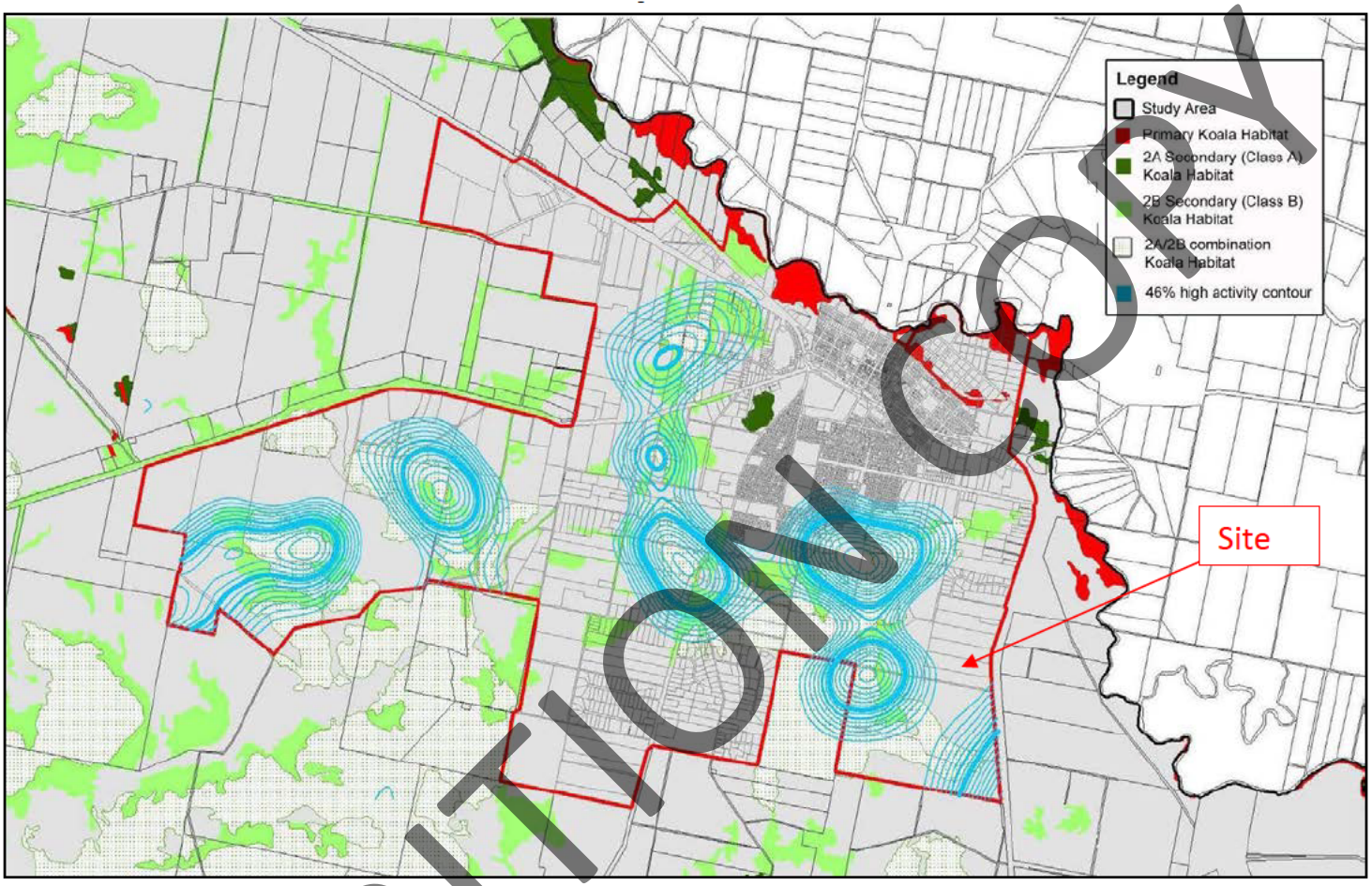

Figure 6: Koala Strategy Gunnedah Focus Area

A search of the NSW Office of Environment and Heritage Bionet Atlas of NSW Wildlife records 1,478 koala sightings in the Gunnedah LGA. A search of the area surrounding the site shows there aren't any Koala sightings recorded on the subject site between 1996 and 2006, however there are five (5) sightings of Koalas within a 5km radius of the site. The coordinates of the sightings are listed below in ***Table 2*** . **Figure 7** shows an extract from this search showing the site and surrounding koala sightings.

Table 2: Bionet Koala Sightings

Koala Sighting	Latitude	Longitude	Date	Distance from Site
1	-31.007472	150.264987	30 June 2006	1.18 km North of Site
2	-31.008933	150.256079	31 August 2021	2.47 km West of Site
3	-31.015807	150.266176	30 June 2006	2 km South west of Site
4	-31.014611	150.273315	30 December 2004	1 km South East of site
5	-31.0197	150.273628	December 2013	1.5 km South East of site

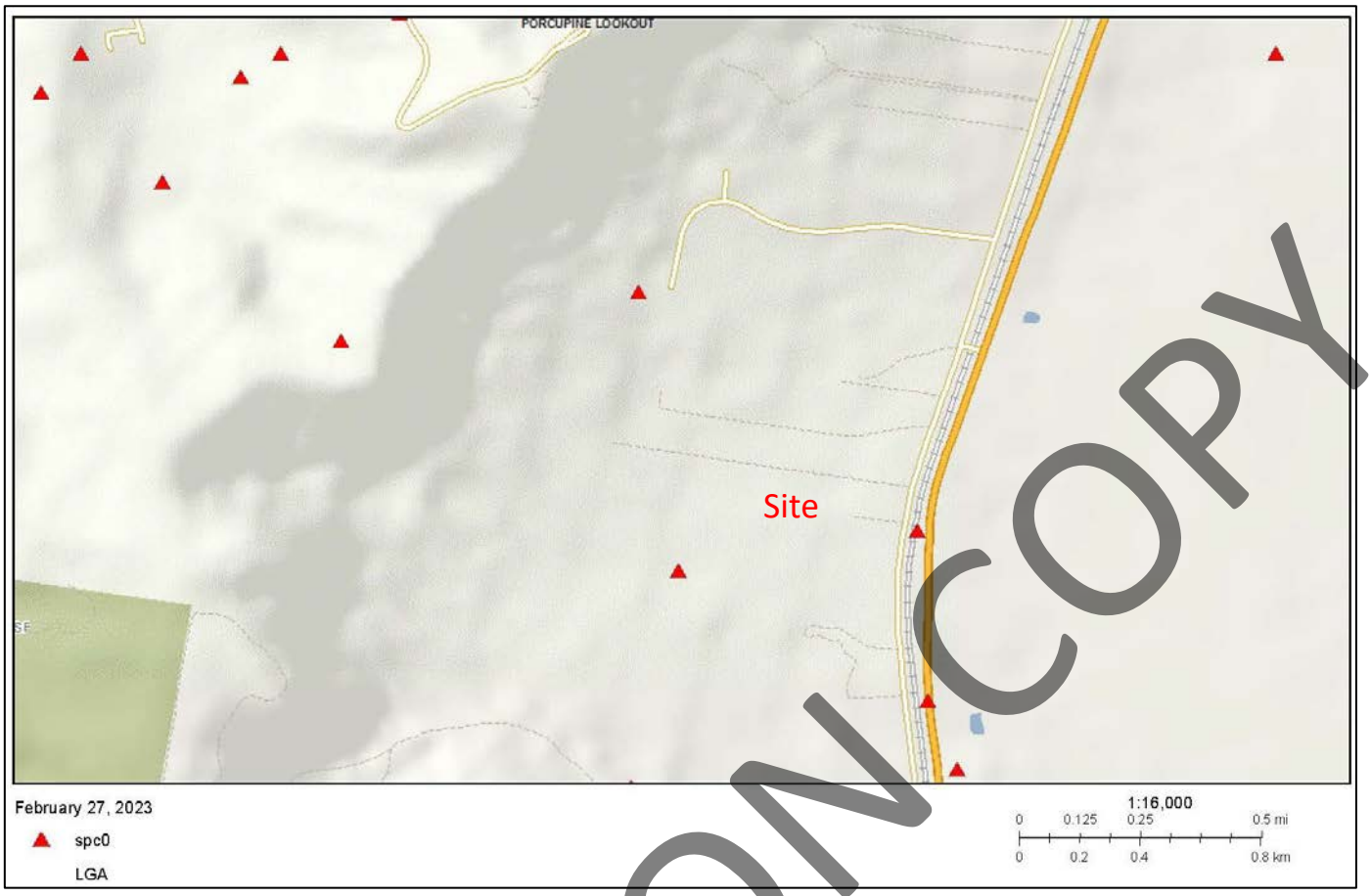

Figure 7: Atlas Map showing Koala sightings in the area (SEED Portal)

Site Investigation

This report is based on a site inspection carried out on 31st March 2023 by Kathryn Stewart of Stewart Surveys who meets the definition of a suitably qualified person to conduct the inspection under the SEPP.

The subject site is located five (5) kilometres south east of town of Gunnedah on the Kamilaroi Road. The site is an agricultural holding which includes cultivated oats and cattle grazing, there are also some agricultural related outbuildings at the size as shown in the site plan **Figure 5**.

A desktop review of the vegetation on the site maps one (1) vegetation community across the site, the vegetation community is described below, shown in **Figure 8**

- **PCT 0**: Non – Native Vegetation.

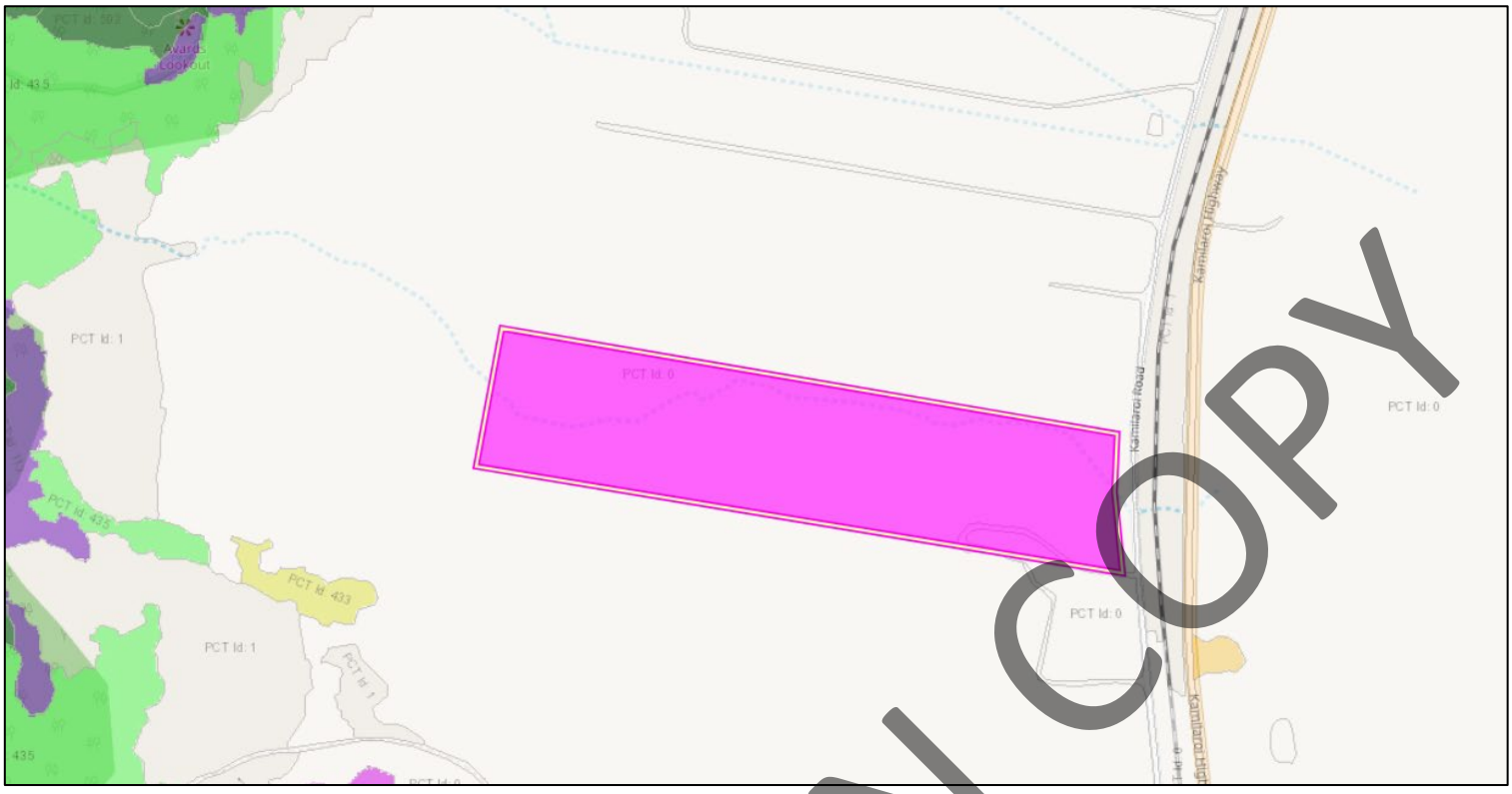

Figure 8: Vegetation Communities

These vegetation communities were verified on site and there were no Koala feed tree species, listed in schedule 1 Chapter 3 of SEPP (Biodiversity Conservation) 2021, identified in **able 1** on the site. The trees on the site includes *Geijera parviflora* (Wilga) and *Eucalyptus melliodora* (Yellow Box).

As there are no Koala feed tree species on the site, the site is not classified as potential Koala habitat under the SEPP.

Clause 3.6 (3) (a) states that if land is not potential Koala habitat, it is not prevented, because of this chapter from granting consent to the development application.

CHAPTER 4 – KOALA HABITAT PROTECTION 2021

This chapter does not apply to land zoned RU1

CHAPTER 5 - RIVER MURRAY LANDS

This chapter does not apply to land in the Gunnedah Shire.

CHAPTER 6 – BUSHLAND IN URBAN AREAS

This chapter does not apply to land in the Gunnedah Shire.

CHAPTER 7 – CANAL ESTATE DEVELOPMENT

This chapter does not apply to land in the Gunnedah Shire.

CHAPTER 8 – SYDNEY DRINKING WATER CATCHMENT

This chapter does not apply to land in the Gunnedah Shire.

CHAPTER 9 – HAWKESBURY-NEPEAN RIVER

This chapter does not apply to land in the Gunnedah Shire.

CHAPTER 10 – SYDNEY HARBOUR CATCHMENT

This chapter does not apply to land in the Gunnedah Shire.

CHAPTER 11 – GEORGES RIVER CATCHMENT

This chapter does not apply to land in the Gunnedah Shire.

CHAPTER 12 –WILLANDRA LAKES REGION WORLD HERITAGE PROPERTY

This chapter does not apply to land in the Gunnedah Shire.

CONCLUSION

We have conducted a full State Environmental Planning Policy (Biodiversity Conservation) 2021 assessment for the proposed subdivision development application. The only chapter which applies to this development is Chapter 3 –Koala Habitat Protection 2020 Our assessment concludes that there are no known impacts of proposed development which prohibit council from supporting this application.

Yours faithfully
STEWART SURVEYS PTY LTD

Kathryn Stewart

Kathryn Stewart
Registered Landscape Architect #001493
Bachelor Landscape Architecture (UNSW)
Masters of Environmental Management (UNSW)

REFERENCES

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** CONCEPT PLAN ONLY **
AREAS AND DIMENSIONS ARE APPROXIMATE AND SUBJECT TO APPROVALS AND SURVEYS

7308
DP 1138376

REFER PLAN 2 FOR LOT DETAILS AND AREAS

118
DP 1176830

679
DP 723481
PORCUPINE RESERVE

289
DP 755503

1
DP 1135280

25

25

115
DP 755503

104
DP 755503

2
DP 805518

106
DP 755503

107
DP 755503

108
DP 755503

STAGE 1 - LOTS 1 TO 11

STAGE 2 - LOTS 12 TO 25

Stewart Surveys
Local people Local knowledge
Surveying, Environmental & Landscape Architecture

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E office@stewartsurveys.com

NOTES:
This subdivision layout is a concept only & dimensions & areas are approximate & subject to council approval. This subdivision layout should not be used for financial planning prior to council approval. The lot yield on this plan may change to reflect council requirements. This plan is to accompany an application to Gunnedah Council and should not be used for any other purpose. Further easements may be created on the final subdivision plan. Restriction on the use of land may be created on the final subdivision plan. These notes are an integral part of this plan.

CLIENT: MR G. AVARD

PROJECT: DEVELOPMENT APPLICATION

DESCRIPTION: PLAN OF PROPOSED SUBDIVISION OF LOT 12 IN DP1244571

Date: 5 AUGUST 2025 | File Ref: 4214 | Drawn: KY | Scale: 1:8,000 | Sheet: 1

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** CONCEPT PLAN ONLY **
AREAS AND DIMENSIONS ARE APPROXIMATE AND SUBJECT TO APPROVALS AND SURVEYS

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00 100 200

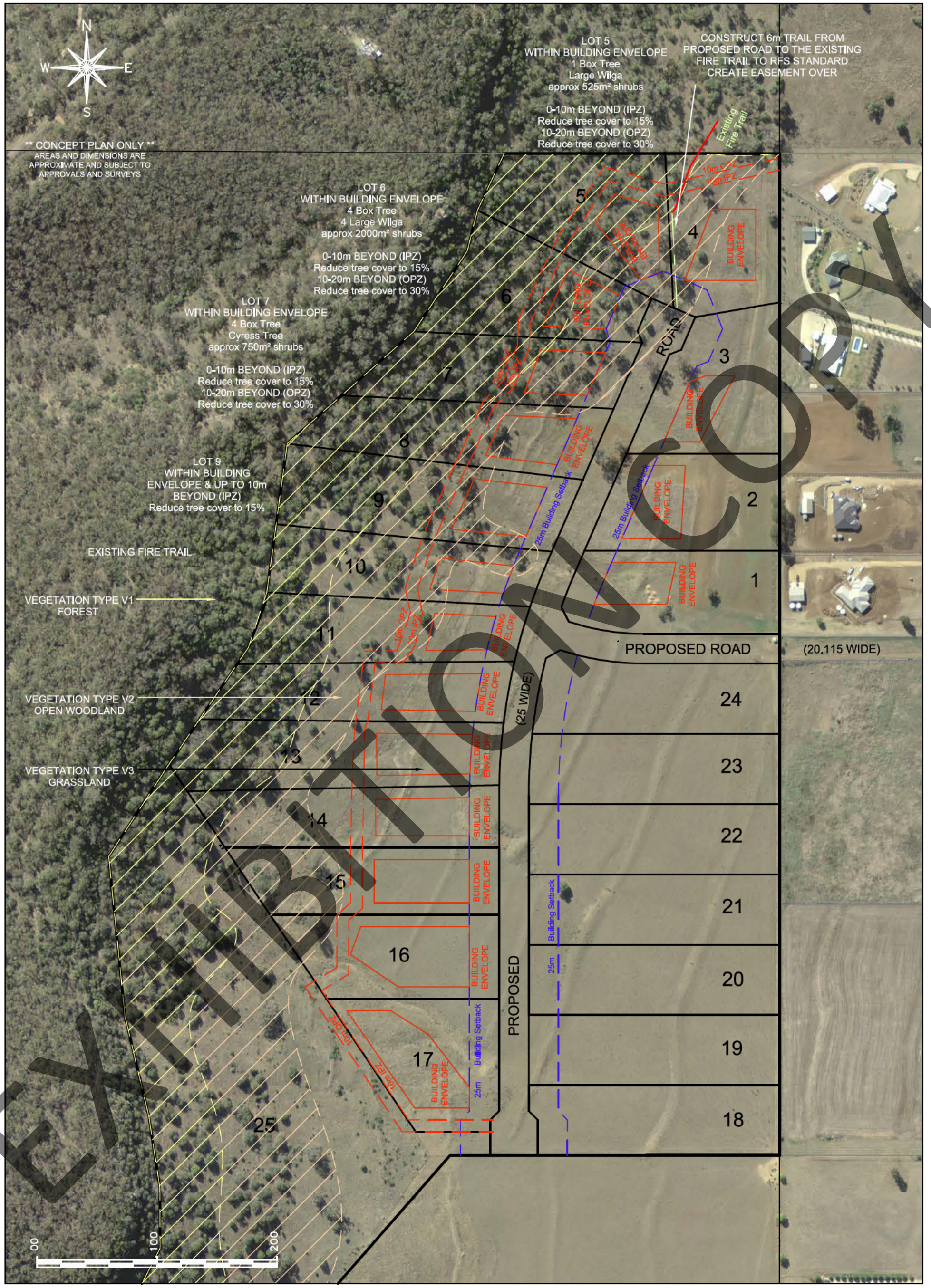
STAGE 1 - LOTS 1 TO 11
STAGE 2 - LOTS 12 TO 17
STAGE 3 - LOTS 18 TO 24

LOT 1 1.21 ha
LOT 2 1.2 ha
LOT 3 1.22 ha
LOT 4 1.23 ha
LOT 5 1.38 ha
LOT 6 1.25 ha
LOT 7 1.2 ha
LOT 8 1.28 ha
LOT 9 1.59 ha
LOT 10 1.2 ha
LOT 11 1.21 ha
LOT 12 1.2 ha
LOT 13 1.52 ha
LOT 14 1.28 ha
LOT 15 1.21 ha
LOT 16 1.21 ha
LOT 17 1.21 ha
LOT 18 1.23 ha
LOT 19 1.25 ha
LOT 20 1.25 ha
LOT 21 1.25 ha
LOT 22 1.25 ha
LOT 23 1.25 ha
LOT 24 1.25 ha
LOT 25 67.63 ha

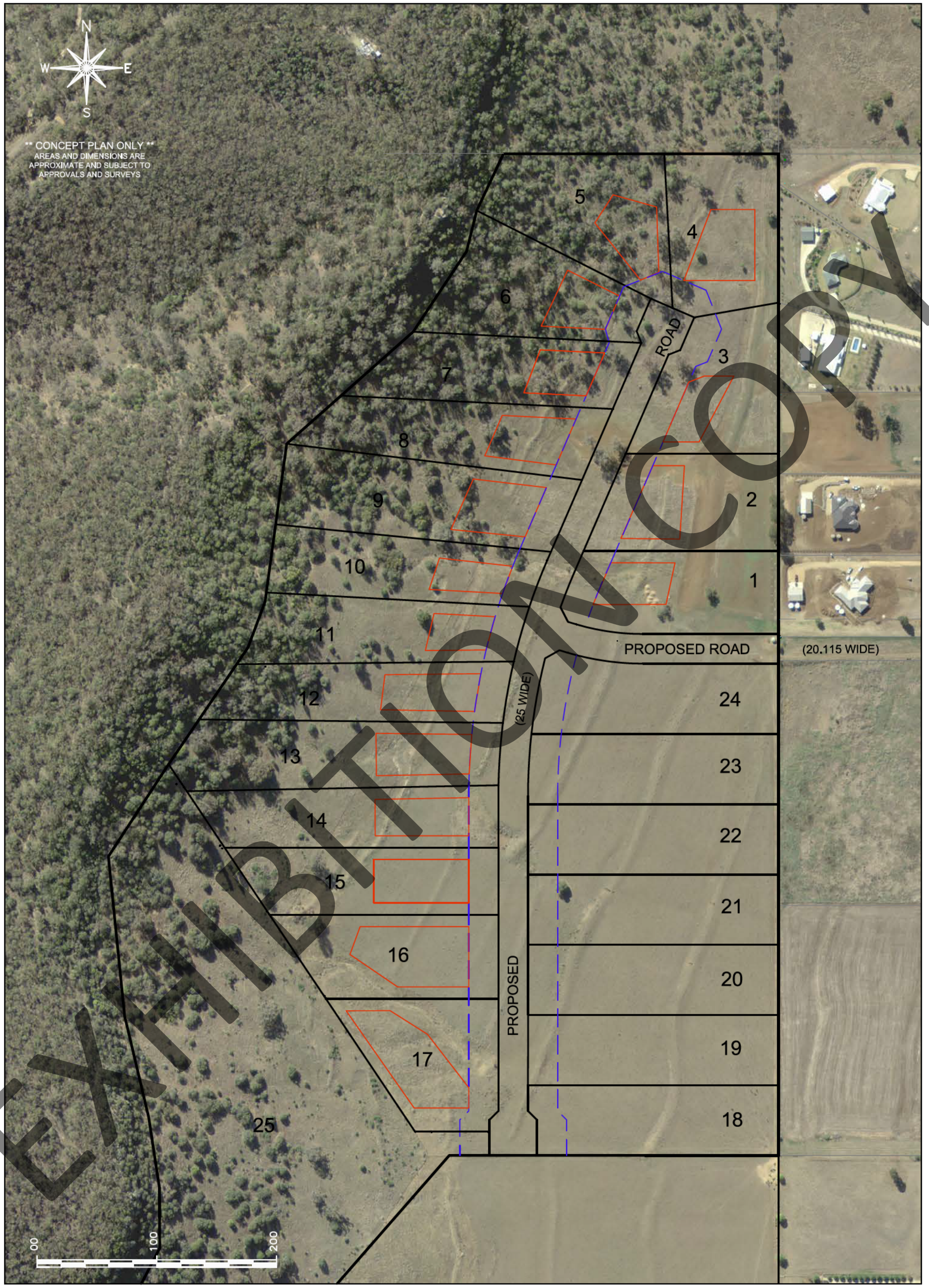
ROAD
PROPOSED ROAD (20.115 WIDE)
PROPOSED (25 WIDE)
EXISTING DEVELOPMENT

679 DP 723481
104 DP 755503
2 DP 805518
115 DP 755503
106 DP 755503
Future Extention of Road

Stewart Surveys — Local people Local knowledge	CLIENT: MR G. AVARD		DESCRIPTION: PLAN OF PROPOSED SUBDIVISION OF LOT 12 IN DP1244571		
	PROJECT: DEVELOPMENT APPLICATION				
	Date: 5 AUGUST 2025	File Ref: 4214	Drawn: KJY	Scale: 1:3000@A3	Sheet: 2

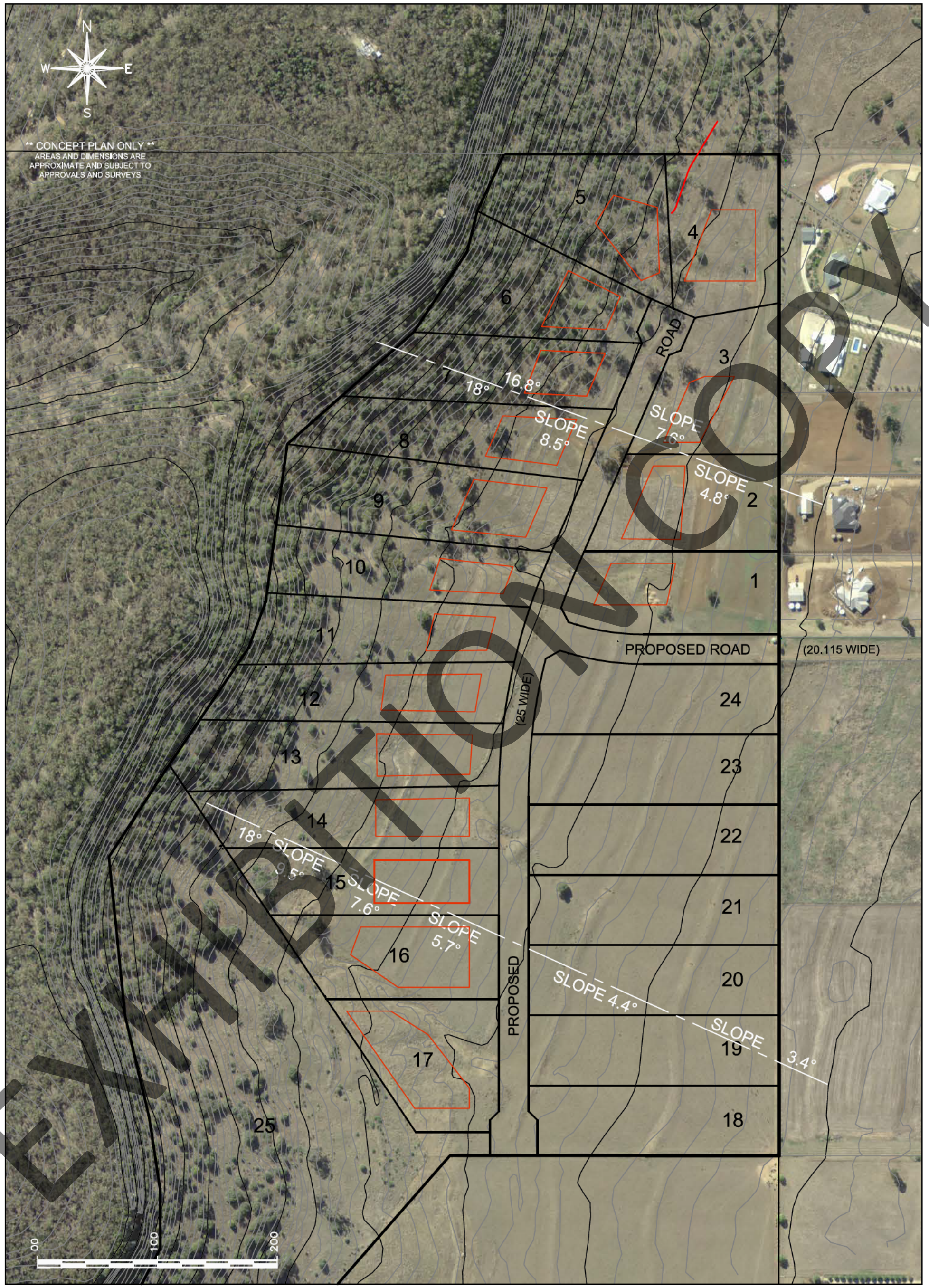


Stewart Surveys — Local people Local knowledge	CLIENT: MR G. AVARD		DESCRIPTION: RURAL FIRE SERVICE OVERLAY PLAN OF PROPOSED SUBDIVISION OF LOT 12 IN DP1244571		
	PROJECT: GATEWAY APPLICATION				
	Date: 5 AUGUST 2025	File Ref: 4214	Drawn: KJY	Scale: 1:3000@A3	Sheet: 3



Stewart Surveys Local people Local knowledge	CLIENT: MR G. AVARD		DESCRIPTION: PLAN OF PROPOSED SUBDIVISION OF LOT 12 IN DP1244571 AERIAL PHOTO OVERLAY		
	PROJECT: DEVELOPMENT APPLICATION				
	Date: 5 AUGUST 2025	File Ref: 5714	Drawn: KJS	Scale: 1:3000@A3	Sheet: 4

Stewart Surveys Local people Local knowledge	CLIENT: MR G. AVARD		DESCRIPTION: VEGETATION ASSESSMENT PLAN OF PROPOSED SUBDIVISION OF LOT 12 IN DP1244571		
	PROJECT: GATEWAY APPLICATION				
	Date: 5 AUGUST 2025	File Ref: 4214	Drawn: KJY	Scale: 1:5000@A3	Sheet: 4

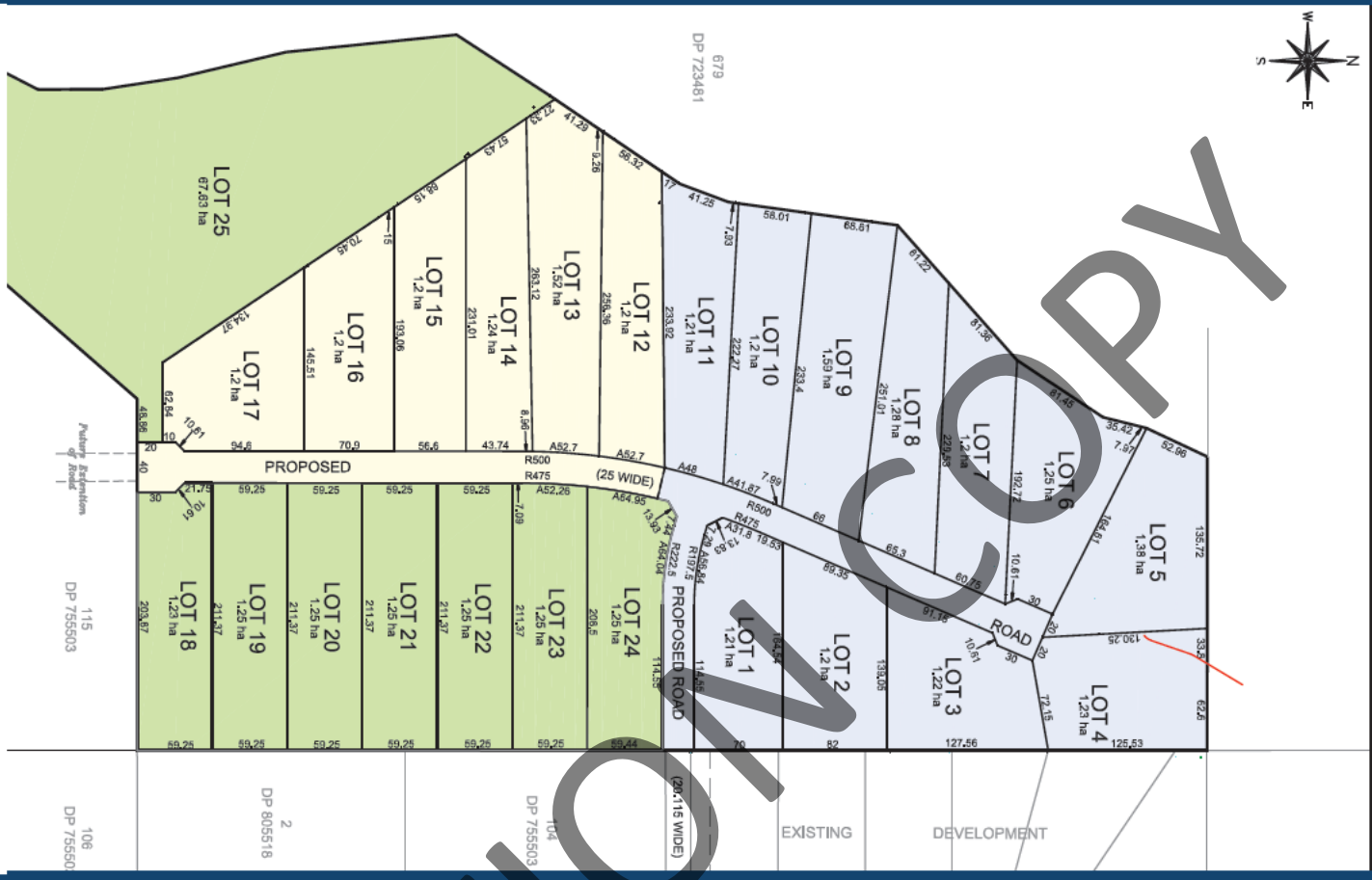


Stewart Surveys Local people Local knowledge	CLIENT: MR G. AVARD		DESCRIPTION: BFA - SLOPE ASSESSMENT PLAN OF PROPOSED SUBDIVISION OF LOT 12 IN DP1244571		
	PROJECT: GATEWAY APPLICATION				
	Date: 5 AUGUST 2025	File Ref: 4214	Drawn: KJY	Scale: 1:3000@A3	Sheet: 5

DEVELOPMENT APPLICATION

MERRILANDS HEIGHTS - VERA CLOSE GUNNEDAH

LOT 12 IN DP 1244571



STORMWATER MANAGEMENT STRATEGY

DATE: : JULY 2025 (VER. 4)

PREPARED FOR:
EMERGE DEVELOPMENTS

PREPARED BY:
Stewart Surveys Pty Ltd
107-109 Conadilly Street,
PO Box 592
GUNNEDAH NSW 2380
office@stewartsurveys.com

Stewart Surveys Reference: 5714

REPORT PREPARATION

Name:	**Daniel Stewart**
Qualifications:	Bachelor of Engineering (UNSW) Bachelor of Arts (UNSW) MIEAust CPEng NPER RPEQ Chartered Professional Engineer
Name:	**Kathryn Stewart**
Qualifications:	Bachelor of Landscape Architecture (UNSW) Masters of Environmental Management (UNSW) Registered Landscape Architect (#001493)
Company:	**Stewart Surveys Pty Ltd** ABN: 65 002 886 508 PO Box 592, Gunnedah NSW 2380 (02) 6742 2966 office@stewartsurveys.com
Version	Ver. 2 - February 2024 Ver 3. – June 2024 **Ver 4 – July 2025**

This Stormwater Management Plan and report has been prepared by our office to accompany a council development application. To the best of our knowledge, the content of this statement is true in all material particulars and does not, by its presentation or omission of information, materially mislead.

INTRODUCTION

Stewart Surveys has been commissioned by Emerge Developments Pty Ltd to prepare a Stormwater Management Plan for the modification to DA 2015/054.004 – Subdivision of Lot 12 in DP1244571 being 299-319 Kamilaroi Road, Gunnedah.

Clarification of Staging

This Stormwater Management Plan only covers stage 2 of the development. Stage 1 is already constructed with water discharging via a waterway parallel to Raymond Drive across Kamilaroi Highway and into the Mooki River catchment. It is proposed to modify the Stage 2 drainage to discharge further south along Kamilaroi Road in an existing waterway as outlined in this report and shown in Figure 1. A concrete causeway will be constructed on Kamilaroi Road to mitigate any impacts of stormwater on the road surface.

The report will address:

- Demonstrate how the system will start with a contour bank/drain on Lot 12 in DP1244571 and Lot 115 in DP755503 to cope with 5yr ARI Event;
- Provide information on the detention storage at the boundary of Lot 115 in DP755503 and Lot 108 in DP755503, and if this storage will be sized to reduce the peak flows to pre development levels;
- Confirm if a drainage easement is provided on Lot 108 in DP755503 to Suit
- Confirm if any of the drainage where water crosses Kamilaroi Road adjacent to Lot 108 in DP755503 will be upgraded to a 5 year ARI event to cope with large concentrated flow.
- Provide engineering calculations/model of the flow from Lot 12 in DP1244571 across Lot 115 in DP755503 and Lot 108 in DP755503 and under Kamilaroi Road to demonstrate conditions are met.

This report has been prepared to satisfy the requested information in the meetings held for the development with Gunnedah Shire Council's infrastructure staff and the requirements of the Gunnedah Shire Council Engineering Guidelines for Subdivision and Developments V2.0 dated August 2013. This document is hereby referred to as the guideline. Section 3.5.2 of this guideline outlines that a stormwater servicing strategy shall be submitted with a development application.

DEVELOPMENT SITE

The subject site is Lot 12 in DP1244571, which is approved for subdivision into 25 rural residential lots. Eleven of these lots, were created in DP1244571, which is stage 1 of the development. In Stage 2 thirteen (13) rural residential lots exceeding 1.2 hectares in size will be created. The stormwater drainage from stage 1 is handled with an easement and waterway through Lots 1 and 10 in DP1244571. This report covers the stormwater drainage from proposed stage 2 of the development, which falls to the south east, away from the stage 1 catchment.

There are a number of dams and contour banks on the subject site, constructed by the soil conservation to manage water runoff from the site. It is proposed to utilise and upgrade this existing stormwater drainage infrastructure to handle the proposed rural residential development runoff. **Figure 1** shows the existing contours on Google Earth with the lot layout overview.

Existing Approval and Site Drainage

We wish to note that the existing approval allows for the stormwater from the development site Stage 1 and 2 to be discharged via overland drains to Raymond Drive, where it extends to the east through private properties to Kamilaroi Road. At the intersection with Kamilaroi Road there is no formal drainage infrastructure (Culvert or causeway), water turns 90 degrees and is carried via the table drain to a culvert south of the site.

We have carried out capacity calculations on the existing gravel causeway 1 kilometre south of Raymond Drive/Crown Road . Based on Mannings Cross Sections at the causeway the maximum flow for H1 hazard category (safe for vehicles to travel through) is 7.1m^3/sec. This event occurs between the 5 year and 10 year event. Therefore, predevelopment at the 5 years event Kamilaroi Road must be closed as it is unsafe for vehicle passage. We have enclosed photos of the existing character of Natural Waterway and causeway at this location. These photos are titled "Existing Causeway in Kamilaroi Road & discharge of Natural Watercouse" .

As agreed with Council the developer will construct a new concrete causeway at the end of the waterway on Lot 108 in DP755503 to mitigate any damage to the road surface of water overtopping in this location. This will mitigate the impacts of the development on the road network.

Advice from NSW on existing waterway on Lot 108

According to the information provided with your letter of 3 March 2025:

- *Storages 1, 2 and 3 appear to be located on minor streams,*
- *Storage 4 appears to be located at the confluence of two 2nd order streams, immediately upstream of a 3rd order stream.*

Dams located on 3rd and higher order stream are defined as an in-river dam. Therefore, it is important to note that Storage 4 is in the Mooki River Water Source of the Namoi and Peel Unregulated Rivers Water Sources 2012 Water Sharing Plan (WSP). Section 52(1A) of the WSP states that a water supply work approval must not be granted or amended to authorise an in-river dam within the Mooki River Water Source. Therefore, WaterNSW would not be able to accept an application for a water supply work approval to authorise Storage 4.

Dams constructed on minor streams in accordance with Schedule 1 are:

- *Excluded from the calculation of maximum harvestable rights dam capacity*
- *Exempt from requiring a water access licence under s21(1) in accordance with Section 12 of Part 1 of Schedule 4 of the Water Management (General) Regulation 2018*
- *Exempt from requiring a water use approval under s34(1) in accordance with Section 12 of Part 1 of Schedule 4 of the Water Management (General) Regulation 2018*
- *Exempt from requiring a water supply work approval under s39(1) in accordance with Schedule 1 of the Water Management (General) Regulation 2018*

Based on this advice and subsequent discussions with Gunnedah Council. The proposed development will discharge at Basin 3. No works will be carried out beyond Basin 3 except for the construction of a concrete causeway at Kamilaroi Road.

Figure 1: Overview Map

(Source: Google Earth)

OBJECTIVES

The principal objectives of the development's stormwater and drainage design are:

- To meet best practice engineering standards;
- To safely and efficiently collect and control stormwater generated within the subdivision in the full development of the site;
- To provide an efficient outlet for all collected stormwater from the subdivision;
- Design and construction of a stormwater network that is both feasible to construct and economical to maintain in the long term;
- Design and construction of a stormwater network that does not place an unnecessary burden on Council's maintenance and operations resources; and
- To achieve these objectives without detrimentally effecting the environment, surface or subsurface water quality or the groundwater infiltration characteristics of the site.

This report addresses this information for the proposed development.

STORMWATER MANAGEMENT STRATEGY

The subject is located on the footslopes of Porcupine Lookout a prominent hill landscape in the town of Gunnedah. Water from the upstream catchment off Porcupine Lookout passes through the subject site, where it is currently intercepted and conveyed via contour banks and open drains through the subject site Lot 12 in DP1244571 and adjoining properties Lot 115 in DP755503 and Lot 108 in DP755503. When it leaves these properties it crossed an unsealed section of Kamilaroi Road and passes through a culvert under the railway. A new concrete causeway will be constructed in the section of Kamilaroi Road opposite the natural waterway. The subject site is in the Mooki River Catchment. Figure 2 shows the catchment area from the subject site.

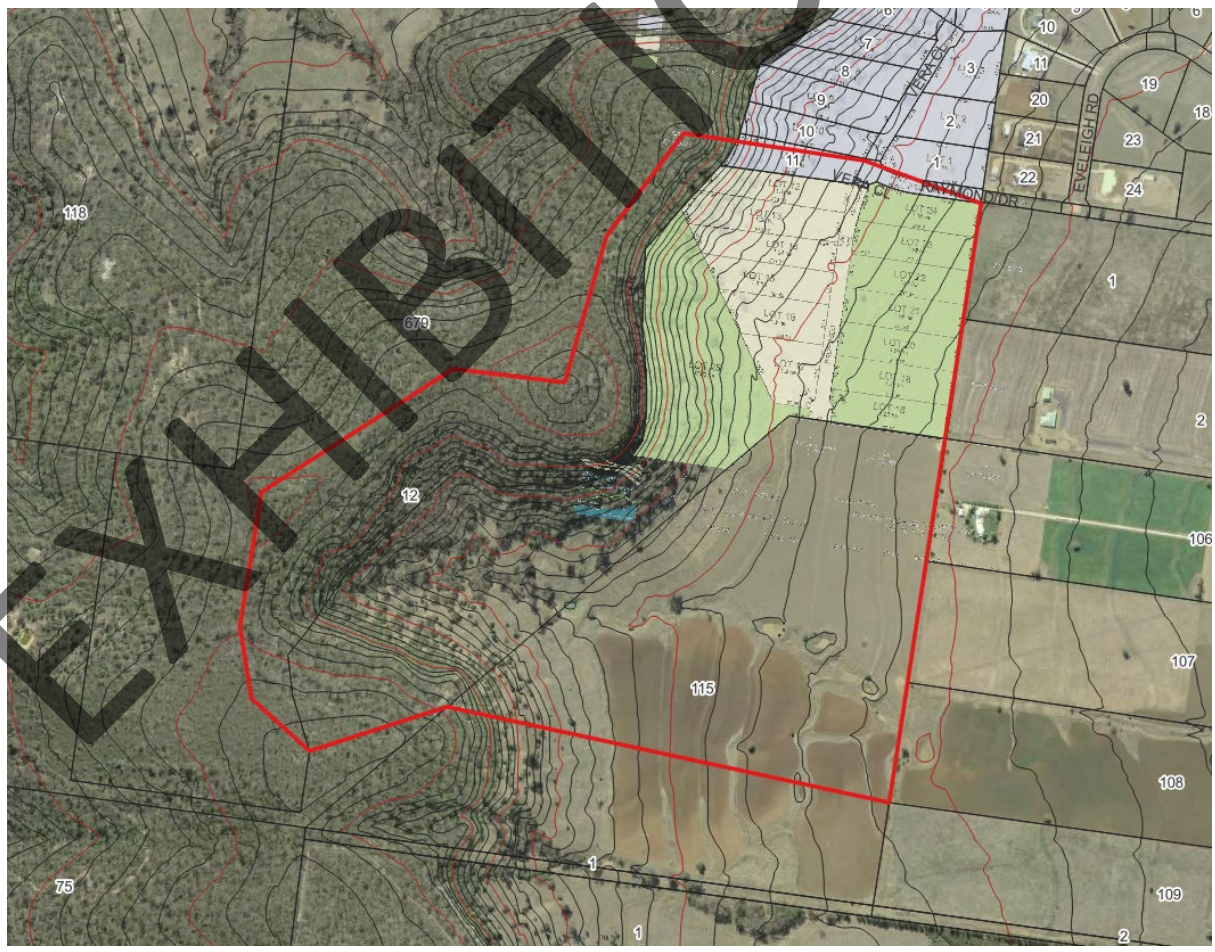


Figure 2: Catchment from Subject Site

Site catchment

The subject site has a upstream catchment of 96.7 hectares including the site, as shown in **Figure 2.** The following calculations only consider the development site catchment and upstream catchment to the discharge point at the eastern boundary of Lot 108 in DP755503.

Design Rainfall Intensity (IFD) as determined by the Bureau of Meteorology for the site for a 45min Time of Concentration.
1 in 5 Year ARI: 39.4mm/hr
1 in 10 Year ARI 44.0mm/hr
1 in 100 Year ARI: 66mm/hr

The Guidelines require residential development to cater for the 1 in 5 year ARI. We calculate the predeveloped stormwater flows for the catchment of the site to be 2.12m^3/sec for the 5 year ARI event.

DEMONSTRATE HOW THE SYSTEM WILL START WITH A CONTOUR BANK/DRAIN ON LOT 12 IN DP1244571 AND LOT 115 IN DP755503 TO COPE WITH 5YR ARI EVENT

The runoff from the development site will fall across the land and into the table drain on the western side of the proposed road. Water upstream of the development area is conveyed by a contour bank on the western side of the building envelopes, which outlets into storage 2 identified in the attached plans.

It is proposed to construct a drain at the end of the cul-de-sac head on the proposed road to the existing contour bank south of the site on Lot 115 in DP755503. The overflow from storage 1 will also drain in this contour bank.

The capacity of the existing contour bank (DRAINS model OF1) has been assessed using several Manning's cross sections. The developed flows discharging at the cul-de-sac head have been determined with a DRAINS model to be 2.23m^3/sec. The existing contour bank generally has at least 0.2% longitudinal grade and is assumed to have a Manning's roughness of 0.03. The surveyed cross section at chainage 100 is included below in **Figure 3** as an example. This cross section will need to be upgraded to have capacity for 100 Year ARI developed flows. This cross section is typical but there are isolated locations with reduced capacity. It is proposed to upgrade the contour bank to have minimum 650mm depth of flow which will provide capacity for 5.6m^3/sec.

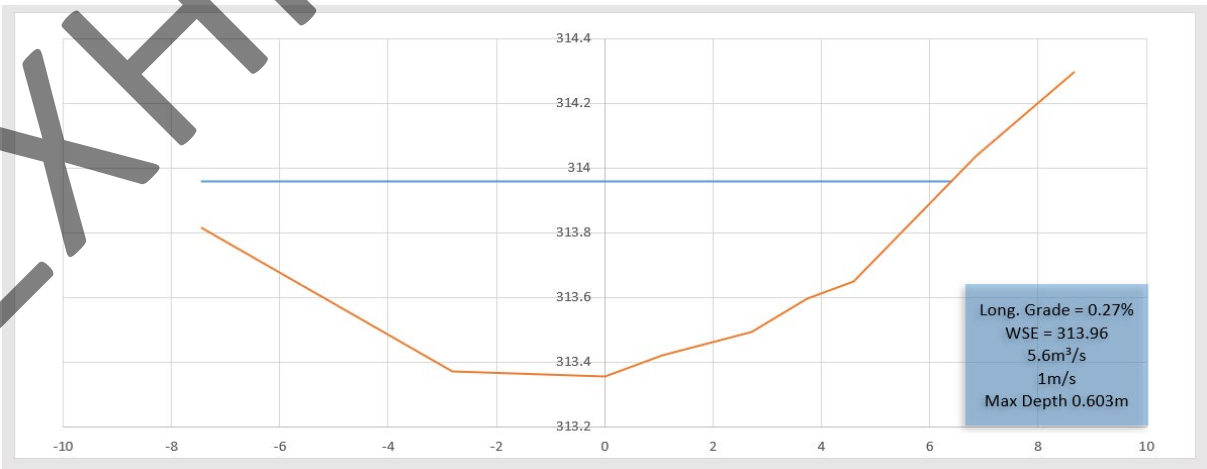


Figure 3: OF1 Chainage 100 Manning's Cross Section

The capacity of the existing contour bank (DRAINS model OF7) has been assessed using Manning's cross sections. The existing contour bank generally has at least 0.2% longitudinal grade and is assumed to have a Manning's roughness of 0.03. The current capacity of the contour bank is 1.5m^3/s. A typical existing cross section is shown below. The 100 year ARI flow (2.33m^3/s) should be contained by the drain. It is proposed to upgrade the contour bank to have minimum 550mm depth of flow which will provide capacity for 3.2m^3/s to accommodate the 100 year ARI flows plus freeboard.

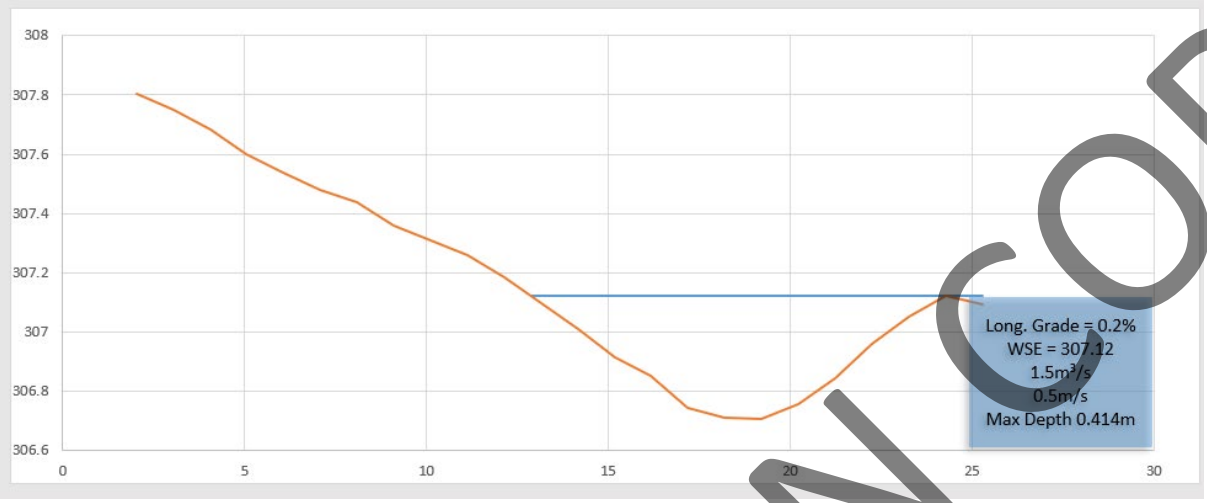


Figure 4: OF7 Chainage 100 Manning's Cross Section

PROVIDE INFORMATION ON THE DETENTION STORAGE AT THE BOUNDARY OF LOT 115 IN DP755503 AND LOT 108 IN DP755503, AND IF THIS STORAGE WILL BE SIZED TO REDUCE THE PEAK FLOWS TO PRE DEVELOPMENT LEVELS;

The existing drainage system will be upgraded at storage dam 2 and along the contour bank leading to storage 3, to reduce peak 5 year ARI flows to pre-developed rates. The attached DRAINS model includes the following:

Dam 2: The walls of the dam shall be raised to RL 312.5, with a 5m wide spillway provided at RL312.2. A 315mm piped low flow outlet is provided at RL 311.3. The water below the low flow outlet is assumed to be retained.

High level outlets in the form of weirs below the top of wall level are also required at storage dam 3. The spillway shall be 5m wide at RL 305.1. Dam 3 does not require raising of the walls or a low flow outlet.

The peak 5 year flow at the downstream boundary of Lot 115 is 1.42m^3/sec in a 3 hour storm event. This is below the predeveloped discharge calculated above.

CONFIRM IF A DRAINAGE EASEMENT IS PROVIDED ON LOT 108 IN DP755503 TO SUIT

An Easement to drain water variable width will be created over the drainage structures (contour bank and storages 1 to 4) on Lots 108 & 115 in DP755503. The benefited party will be ***the proposed subdivision lots***. ***Maintenance of the structures will be the responsibility of the land owner of Lots 115 and 108 in DP755503, which is currently the developer Emerge Developments.*** This easement will be registered prior to issue of a subdivision certificate.

CONFIRM IF ANY OF THE DRAINAGE WHERE WATER CROSSES KAMILAROI ROAD ADJACENT TO LOT 108 IN DP755503 WILL BE UPGRADED TO A 5 YEAR ARI EVENT TO COPE WITH LARGE CONCENTRATED FLOW.

The proposed works to increase the capacity of storage dam 2 as well as minor improvements to the contour bank will ensure the flows from the site don't exceed the predevelopment flows. Therefore, there is no concentration of flows as at Kamilaroi Road as a result of this development.

In the past there has been water wash over Kamilaroi Road opposite the northern end of Lot 108 in DP755503, this is due to water overtopping the drain when water is turned 90 degrees. To mitigate this the developer has agreed to construct a concrete causeway opposite the waterway on Lot 108 in DP755503.

PROVIDE ENGINEERING CALCULATIONS/MODEL OF THE FLOW FROM LOT 12 IN DP1244571 ACROSS LOT 115 IN DP755503 AND LOT 108 IN DP755503 AND UNDER KAMILAROI ROAD TO DEMONSTRATE CONDITIONS ARE MET.

Stormwater has been calculated in DRAINS software. Please see attached screenshots of the drains model demonstrating the results outlined in this report.

EASEMENTS ARE TO BENEFIT UPSTREAM PROPERTIES, NOT COUNCIL.

The proponent proposes the easement to benefit the proposed subdivision lots and burden the subject lot on which is it located. The responsibility to maintain and repair in perpetuity will be the onus of the land owner on which the structure is situated. At present the land the drainage structures are located on is owned by Emerge Developments the same developer as the large lot residential subdivision. Easements will be registered on title and therefore future owners will be aware of this requirement at the time of purchase.

THE DETENTION STRUCTURES SHOULD BE REMOVED FROM THE CALCULATIONS.

We refer to GSC's Condition of Consent for the Modification of Consent Application No 2015/054.004 Item E3 which requires stormwater from the development site to not be concentrated onto adjoining land as well as referring to GSC's Request for Additional Information to the Modification of Consent Application No 2015/054.004 Item 2 dot point 2 which requires peak post development flows to be reduced to pre developed levels. Both of these conditions require the post-developed flows to be reduced to pre-developed levels. section 3.16.2 of the GSC Engineering Guidelines permits the use of stormwater detention and retention where it is the only practical solution to control the flows. We are of the opinion that in this instance, a detention basin(s) is the only practical solution.

Regarding the location of the basins being 'on-stream', it is acknowledged that the basins are located on a blue line, however the proposed design incorporates and modifies the 4 existing dams constructed by the soil conservation and does not construct any new basins. Adopting this approach of utilising the existing stormwater infrastructure reduces the footprint of construction works which in turn reduces the loss of ground cover and risk of erosion. Furthermore, this approach of re-using existing infrastructure is a practical approach that is environmentally and fiscally responsible as evidenced by the fact that if the development doesn't proceed, then there will still be 4 'on line' dams.

Based on the above, we believe there is a need for the basins to meet the conditions of consent and the developer is modifying the 4 existing 'on-line' basins which is an environmentally responsible approach rather than creating new infrastructure that increases the loss of groundcover. If this is accepted, then the basin should remain in the calculations.

The drainage outlets for these structures are located at least 1.5 metres above the base of the basins. As they are not located at the base of the basin the likelihood of sedimentation is low. To protect the integrity of the drainage structure it is proposed to implement a management plan which will be adhered to by the land owner on which the structures are located.

MANGAGEMENT PLAN

- Land owner to inspect detention basins regularly after a every storm event or at a minimum biannually.
- As required the land owner is to clear sediment from the basin to ensure that the low flow outlet freely drains at all times.
- Banks of drainage structures are to be maintained at Storage 2 – top of bank RL 312.5m AHD and any erosion is to be repaired immediately.
- Contour bank leading from development site to storage to maintain a minimum of 0.5m height from the drain to the top of the bank. Any erosion is to be repaired immediately and contours are to be scraped out to clear sediment as required.
- All management activities required to maintain the integrity of the stormwater system will be carried out at the land owner expense.

INCLUDE ANALYSIS AND DISCUSSION OF THE 1% AEP.

Existing Contour banks constructed over 30 years ago, to manage stormwater flows coming off Porcupine Lookout Reserve. These contours are 70 to 115 metres apart horizontally and even in very large storm events where there was flooding in the region, the land owner comments that there was no failure of the system. The ground is very porous and has a large water infiltration rate. The proposed development will result in an increase of water into this system. There are two existing contour banks upstream of the proposed drainage system. These contour banks intercept water upstream and convey them to a natural watercourse to the south. The contour bank downstream of the development site is being improved to provide suitable capacity to carry the water from the development. In a 1% AEP event there is a second contour bank below this system to catch any overflow of water. This contour bank drains water into storage 3 in the development and safeguards adjoining properties from development runoff.

Section 3.6.4.1 Major Drainage Systems of the Gunnedah Subdivision and Engineering Guidelines states that the major system is to be designed to convey the flows resulting from the 100 year ARI storm event to the natural watercourse. There is a natural watercourse on the subject site aligning with storage 2, 3 and 4 as shown in Figure 4.

This proposal to modify the approved stormwater management plan which outlets all water in a waterway along Raymond Drive to Kamilaroi Highway will split the development water to two crossing points at Kamilaroi Road one at the intersection of the crown road (extension of Raymond Drive) and the water from stage 2 at the northern boundary of Lot 108 in DP755503. This splitting of the development water into two crossing points at Kamilaroi Road will mitigate the impacts of water flow overtopping the drain and crossing the road. Although the Guidelines state that a developer is not required to implement stormwater measures after a natural water course.

Figure 5: Overview of Natural Watercourse in relation to drainage basins

DISCUSS HOW STORM WATER FLOWS WILL NOT BE CONCENTRATED ONTO ADJACENT PROPERTIES, ESPECIALLY 287-297 KAMILAROI HIGHWAY.

Storage basins 1, 2, 3 and 4 are a combination of retention and detention basins used to reduce the 1 in 5 year post-developed stormwater flows to pre-developed levels. The existing dams and contour banks have been modified to provide sufficient capacity to achieve this. Regarding impact to Lot 107 DP755503 (287-297 Kamilaroi Road), the existing contour banks on the northern boundary of Lot 108 DP755503 are typically sufficient to carry the 1 in 5 year event between the basins and to the culvert at Kamilaroi Road, with localised exceptions whereby the height of the contour needs to be increased to achieve min 500mm depth. This requirement has been noted on the design plans. The stormwater management plan provide commentary on the post developed design flows and capacity of the contour banks to demonstrate they have sufficient size.

PROVIDE VALUES FOR ALL PARAMETERS USED IN THE FLOW VELOCITY CALCULATIONS.

The velocity of the stormwater flow along the contour banks has been calculated using the geometry of the contour banks and the Mannings equation. A design flow of 5.6m³/s was adopted (100 year ARI flows), water depth of 650mm, a longitudinal grade of 0.27% and a manning roughness of 0.03 which is equivalent to grass lining. The resulting velocity is 0.7m/s. The existing channel contains good grass cover and with a velocity of less than 2m/s this is an acceptable ground cover.

Please see below table outlining the 20 year ARI and 100 year ARI event

		20 Year ARI		100 Year ARI		Comments
	Capacity [m3/s]	Q [m3/s]	V [m/s]	Q [m3/s]	V [m/s]	
Contour Bank (OF1)	5.6	3.71	0.83	5.6	1.0	Capacity required minimum 650mm depth - this requires upgrade at some locations
Contour Bank (OF7)	3.2	1.54	0.55	2.33	0.63	Capacity required minimum 550mm depth - this requires upgrade at some locations

Downstream Channel Existing (OF5a)	5.4	5.39	1.1	10.9	1.3	Upstream of CH 1660 (CH100) 750mm deep for 100 year capacity
Downstream Channel Existing (OF5b)	5.8	5.39	2.26	10.9	2.9	Upstream of CH 1660 (CH900) 400mm deep for 100 year capacity
Downstream Channel Proposed (OF5c)	11	5.39	1.6	10.9	2.0	Downstream of CH 1660 - 16m base 1 in 5 batters 2.1% grade

Contour Bank (OF1) velocity has been calculated using the following parameters:

Water Surface	**313.96**	**m AHD**
Max Depth	**0.60**	**m**
Longitudinal Grade	**0.27**	**%**
Longitudinal Slope	**0.0027**	**m/m**
Flow Area (A)	**5.81086**	**m²**
Wetted Perimeter (P)	**13.91**	**m**
Hydraulic Radius	**0.417764**	**m**
Horton-Einstein Manning's n	**0.03**	
Hydraulic Mean Depth	**0.419511**	**m**
Froude Number	**0.477136**	
Capacity (Q)	**5.624558**	**m^3/s**
Velocity (V)	**0.967939**	**m/s**

Contour Bank (OF7) velocity has been calculated using the following parameters:

Water Surface	**307.26**	**m AHD**
Max Depth	**0.55**	**m**
Longitudinal Grade	**0.2**	**%**
Longitudinal Slope	**0.002**	**m/m**
Flow Area (A)	**4.57**	**m²**
Wetted Perimeter (P)	**14.20**	**m**
Hydraulic Radius	**0.32**	**m**
Horton-Einstein Manning's n	**0.03**	
Hydraulic Mean Depth	**0.323**	**m**
Froude Number	**0.393**	
Capacity (Q)	**3.19**	**m^3/s**
Velocity (V)	**0.70**	**m/s**

Downstream Channel Existing (OF5a) velocity has been calculated using the following parameters:

Water Surface	**314.15**	**m AHD**
Max Depth	**0.77**	**m**
Longitudinal Grade	**0.4**	**%**
Longitudinal Slope	**0.004**	**m/m**
Flow Area (A)	**8.394348**	**m²**
Wetted Perimeter (P)	**16.78**	**m**
Hydraulic Radius	**0.500404**	**m**
Horton-Einstein Manning's	**0.03**	
Hydraulic Mean Depth	**0.502716**	**m**
Froude Number	**0.598356**	
Capacity (Q)	**11.15431**	**m3/s**

Velocity (V)	**1.328788**	**m/s**

Downstream Channel Existing (OF5b) velocity has been calculated using the following parameters:

Water Surface	**297.41**	**m AHD**
Max Depth	**0.38**	**m**
Longitudinal Grade	**4**	**%**
Longitudinal Slope	**0.04**	**m/m**
Flow Area (A)	**3.7968425**	**m²**
Wetted Perimeter (P)	**13.47**	**m**
Hydraulic Radius	**0.281837696**	**m**
Horton-Einstein Manning's	**0.03**	
Hydraulic Mean Depth	**0.282503162**	**m**
Froude Number	**1.721453517**	
Capacity (Q)	**10.88088055**	**m3/s**
Velocity (V)	**2.865770849**	**m/s**

Downstream Channel Proposed (OF5c) velocity has been calculated using the following parameters:

Max Depth	**0.304**	**m**
Longitudinal Grade	**2.1**	**%**
Longitudinal Slope	**0.021**	**m/m**
Flow Area (A)	**5.33**	**m²**
Wetted Perimeter (P)	**19.1**	**m**
Hydraulic Radius	**0.28**	**m**
Horton-Einstein Manning's	**0.03**	
Froude Number	**1.24**	
Capacity (Q)	**11**	**m3/s**
Velocity (V)	**2.0**	**m/s**

It is acknowledged that the natural waterway does not contain the 1% AEP event water. However, as noted able NSW Water has advised that no works should be carried out on Storage 4 or downstream as this is part of the Natural Watercourse Mooki River System.

Design Capacity of Detention Basins

Basin	**Volume RL**	**Structure**	**Design Capacity**
Storage 1	319.5	Spillway RL	
Storage 2	311.3	Low Flow Pipe	3498 m^3
Storage 2	312.2	Weir (5m Wide)	5972 m^3
Storage 3	305.41	-	777 m^3
Storage 4	299.9	Low Flow Pipe	1145 m^3
Storage 4	300.3	Weir (10m wide)	1610 m^3

Concrete Causeway at Kamilaroi Road

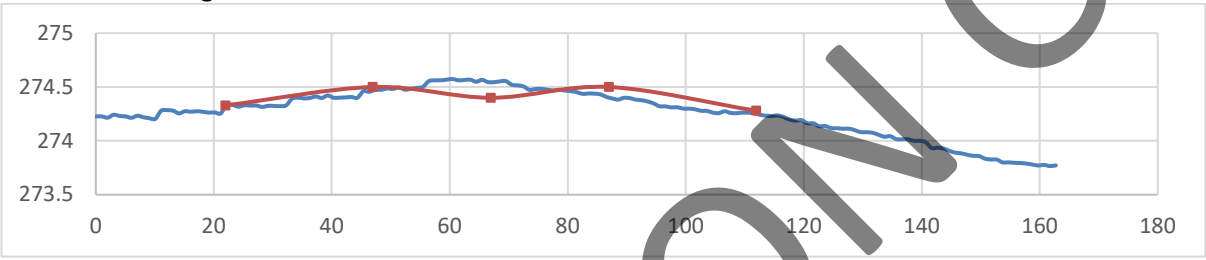
Council has requested that the design include a concrete causeway on Kamilaroi Road downstream of the site discharge point (at the outlet of DRAINS model OF6). This location is currently a crest in the Kamilaroi Road long section. We have considered 2 options to construct a causeway at this location:

Intrude a Sag in Kamilaroi Road

Introduce a sag with 0.5% grade towards a low point at the proposed drainage line outlet. There is an existing sag ~100m to the south (approximately Chainage 170 below) which limits the length available for vertical curves. This option would require the introduction of a sag vertical curve (VC) and 2 crest VCs as a minimum.

During the investigation of a preliminary design, it was noted that the available length would only allow for a 'K' value of approximately 40. Austroads Guide to Road Design Geometric Design specifies the minimum 'K' value at a crest for a 100km/hr road as 200. If a crest VC with a K value of 40 was introduced 45km/hr speed advisory signs should be installed.

An indicative long section is shown below.



Construct a Causeway at existing grade

Alternatively, a 20m concrete causeway could be installed at the existing road levels. This would avoid introducing a significant speed constraint. This option would be sensitive to flows being redirected around the causeway by minor obstructions or vegetation.

Either option would achieve the desired effect of protecting the road from damage when overtopped by storm water but both options require some design compromise. We recommend constructing a causeway at the existing road grades to avoid introducing a significant speed reduction on an otherwise straight section of road.

CONCLUDING STATEMENTS

The stormwater management plan proposes a modification to the stormwater drainage for stage 2 of an already approved development consent to subdivide the site into 25 Lots (approval no. 2015/054). The report is summarised in the following key points:

- The existing Approval allows for all 25 Lots to discharge their stormwater with no detention to Kamilaroi Road concentrated at crown road reserve extension of Raymond Drive
- The proposal outlined in this report splits the development water so that stage 2 (13 lots) follows the exiting drainage pathway and discharges in an existing water at Kamilaroi Road in Lot 108 in DP755503.
- The proposal includes detention structures to mitigate increased runoff from the development crossing Kamilaroi Road, it also reduces the concentration of water by splitting the locations where water crosses Kamilaroi Road. All water still falls in the same Mooki River Catchment.

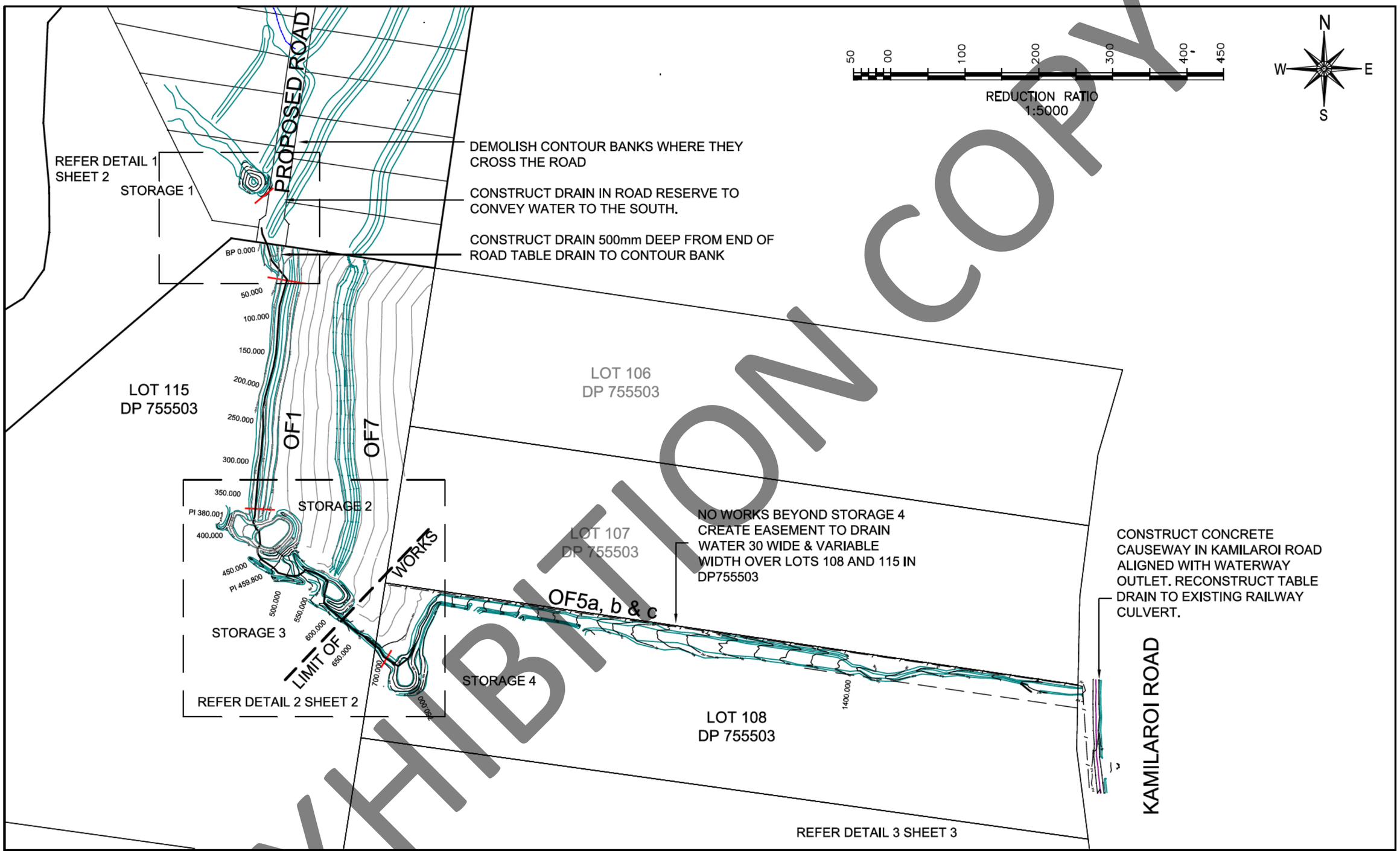
- The proposed basins are improvements to existing basins/dams which are used for primary production purposes. This means there is no new water storage construction and no additional land clearing is required.
- The existing basins are located on a natural watercourse and Gunnedah Shire Council guidelines state that water needs to be catered for up to the intersection with a natural watercourse (storage 4).
- To mitigate concerns about management of these structures a management plan will be put in place for the land owner to undertake regular monitoring and maintenance of these basins.
- The land owner estimates the increased hardstand from the development is approximately 1200 square metres per lot, or 7,200 square metres total. This is not a large area within the size of the catchment.
- The land owner notes that the ground in this are is very porous and the existing contour bank system installed by the soil conservation in the 80's has held up with no failure over time and no significant instances of erosion.
- *The existing causeway at Kamilaroi Road only allows safe vehicle passage up to the 1 in 5 year storm event. This is not changed by the discharge of water from 6 additional lots as the proponent is detaining the water up to the 1 in 5 year event on site.*
- *The developer will construct a new concrete causeway at Kamilaroi Road, opposite Lot 108 in DP755503 to mitigate any impacts on the gravel road surface and burden on rate payers.*

We believe the stormwater management plan is consistent with the Gunnedah Engineering and Subdivision Guidelines and provides an improved stormwater management design to the existing approved stormwater management plan for the development.

APPENDIX A

SITE PLANS

Stormwater Strategy for Drainage Works on Lot 12 in DP1244571 and Lots 108 and 115 in DP755503.



Stewart Surveys
Local people
Local knowledge
Surveying, Environmental & Landscape Architecture

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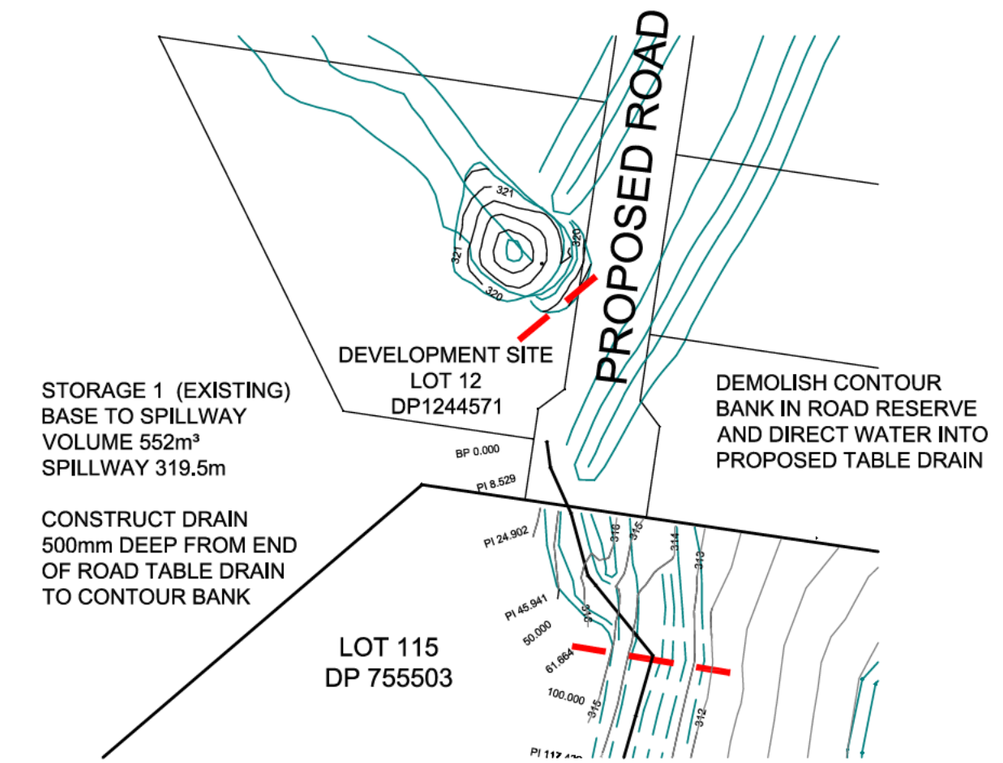
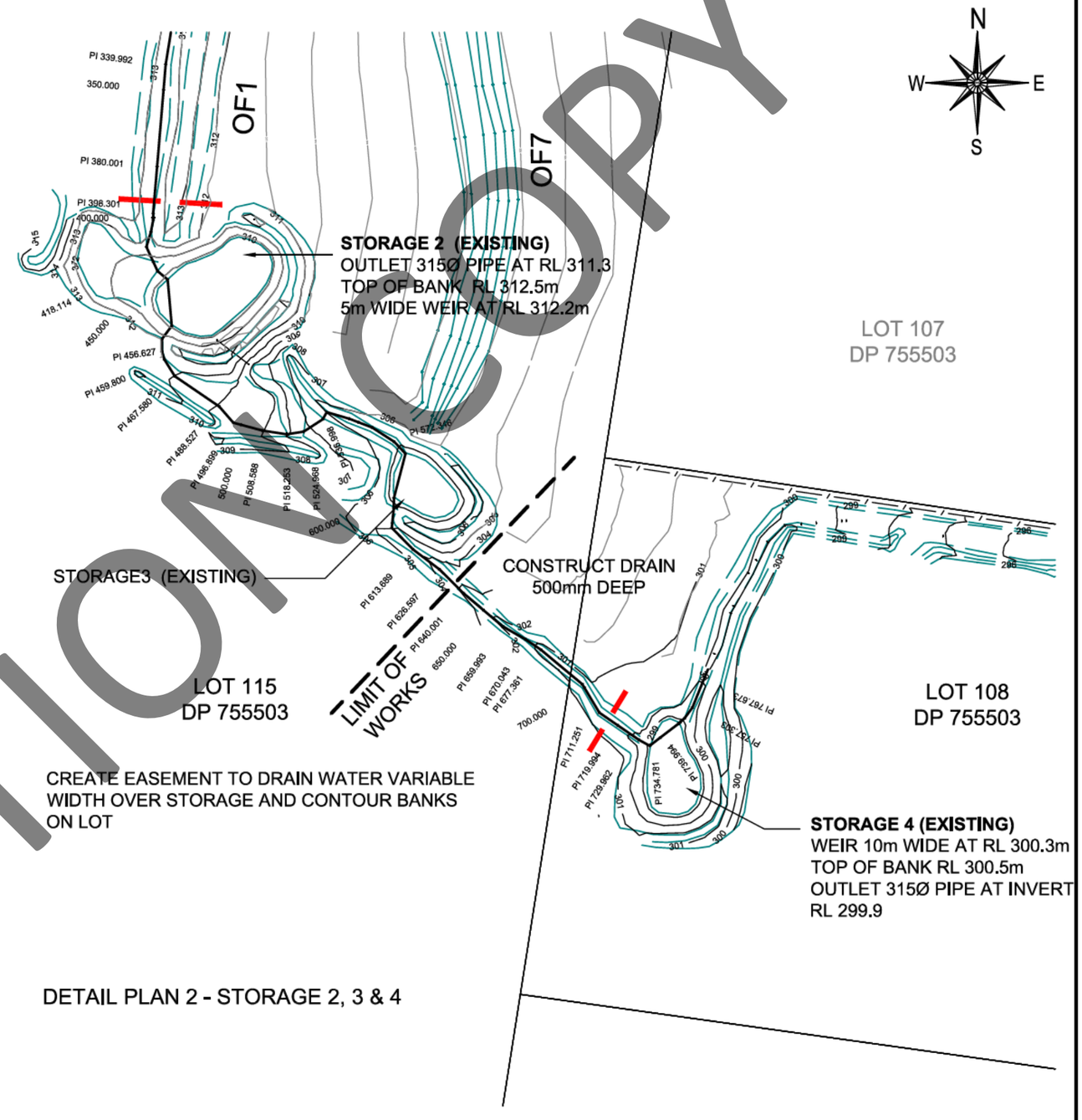
CLIENT: EMERGE DEVELOPMENTS PTY LTD			DESCRIPTION: STORMWATER STRATEGY FOR DRAINAGE WORKS ON LOT 12 IN DP1244571 AND LOTS 108 AND 115 IN DP755503	
PROJECT: MERRILANDS HEIGHTS ESTATE				
Date: 5 AUGUST 2025	File Ref: 5714	Drawn: KS	Scale: 1:5000	Sheet: 1



DETAIL PLAN 1 - STORAGE 1 & DRAIN TO EXISTING CONTOUR



DETAIL PLAN 2 - STORAGE 2, 3 & 4

00 20 40 60 80 100 120 140 160 180 200

REDUCTION RATIO
1:2000

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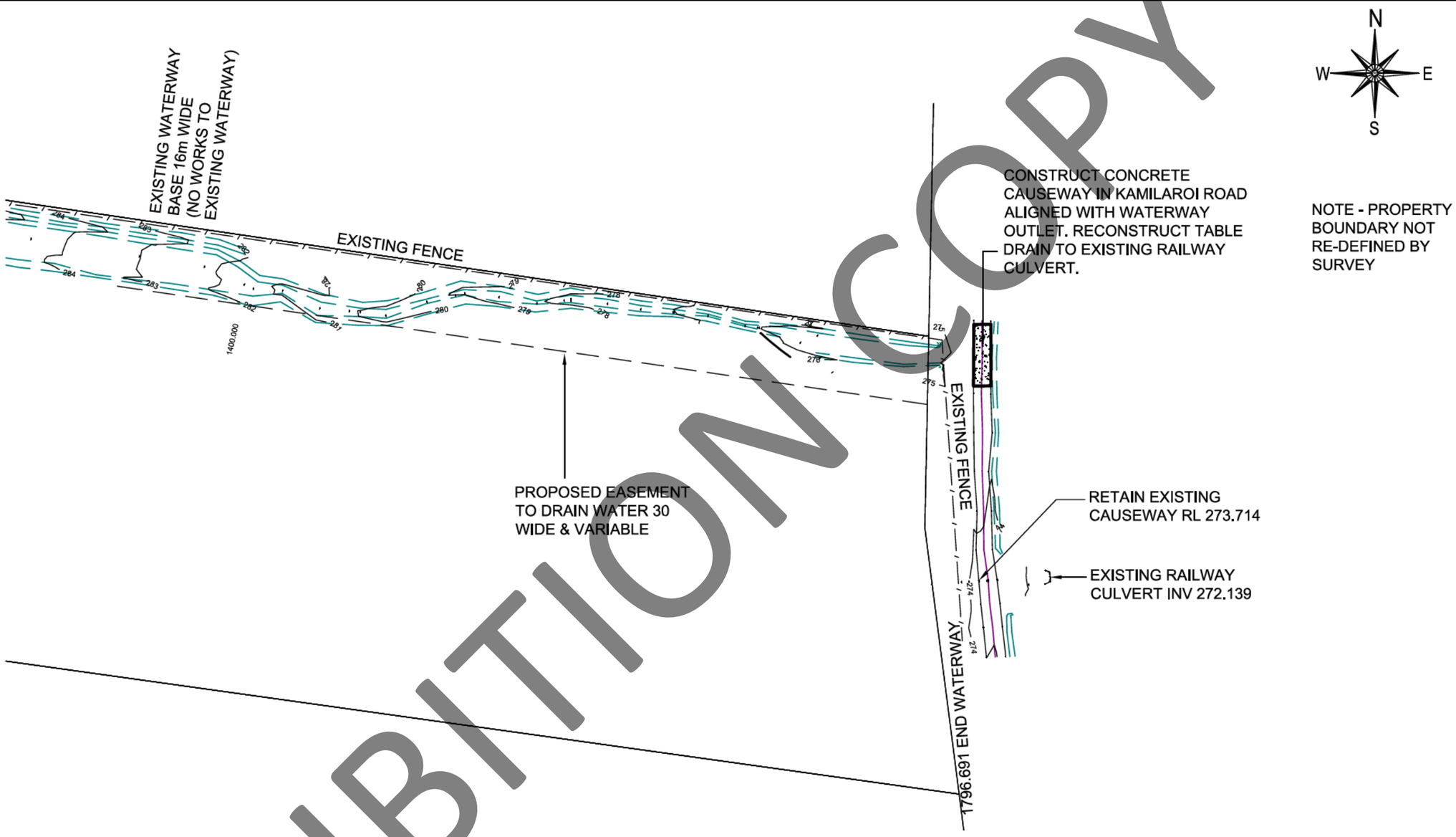
PROJECT: MERRILANDS HEIGHTS ESTATE			
Date: 5 AUGUST 2025	File Ref: 5714	Drawn: KS	Scale: 1:2000 Sheet: 2



DETAIL PLAN 3 - WATERWAY CONSTRUCTION

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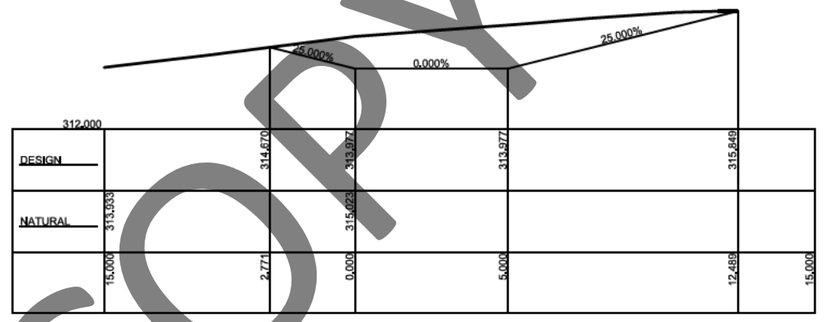
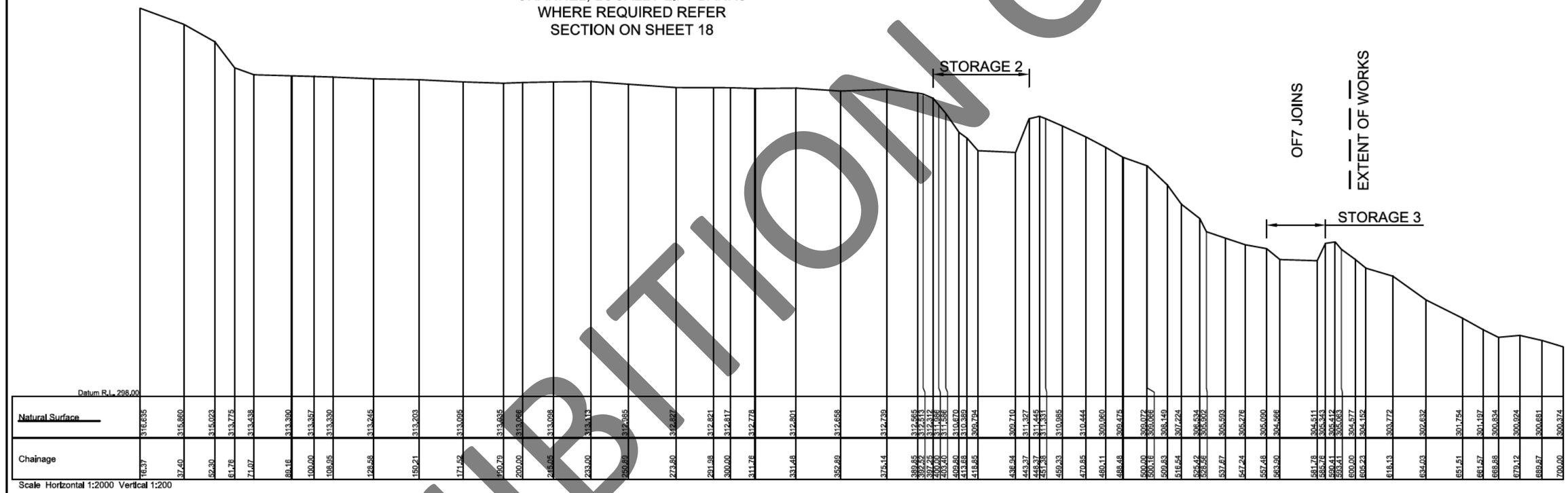
PROJECT: MERRILANDS HEIGHTS ESTATE				
Date: 5 AUGUST 2025	File Ref: 5714	Drawn: KS	Scale: 1:2000	Sheet: 3



WATERWAY FROM END OF CUL-DE-SAC TO EXISTING CONTOUR (CH61.76)
TYPICAL SECTION

OF1

ENSURE EXISTING BANKS
PROVIDE 0.5m DEPTH IN
CHANNEL, LOCALLY LIFT BANKS
WHERE REQUIRED REFER
SECTION ON SHEET 18



Scale Horizontal 1:2000 Vertical 1:200

WATERWAY LONGITUDINAL SECTION CHAINAGE 0.00 - 700.00

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PROJECT: MERRILANDS HEIGHTS ESTATE			
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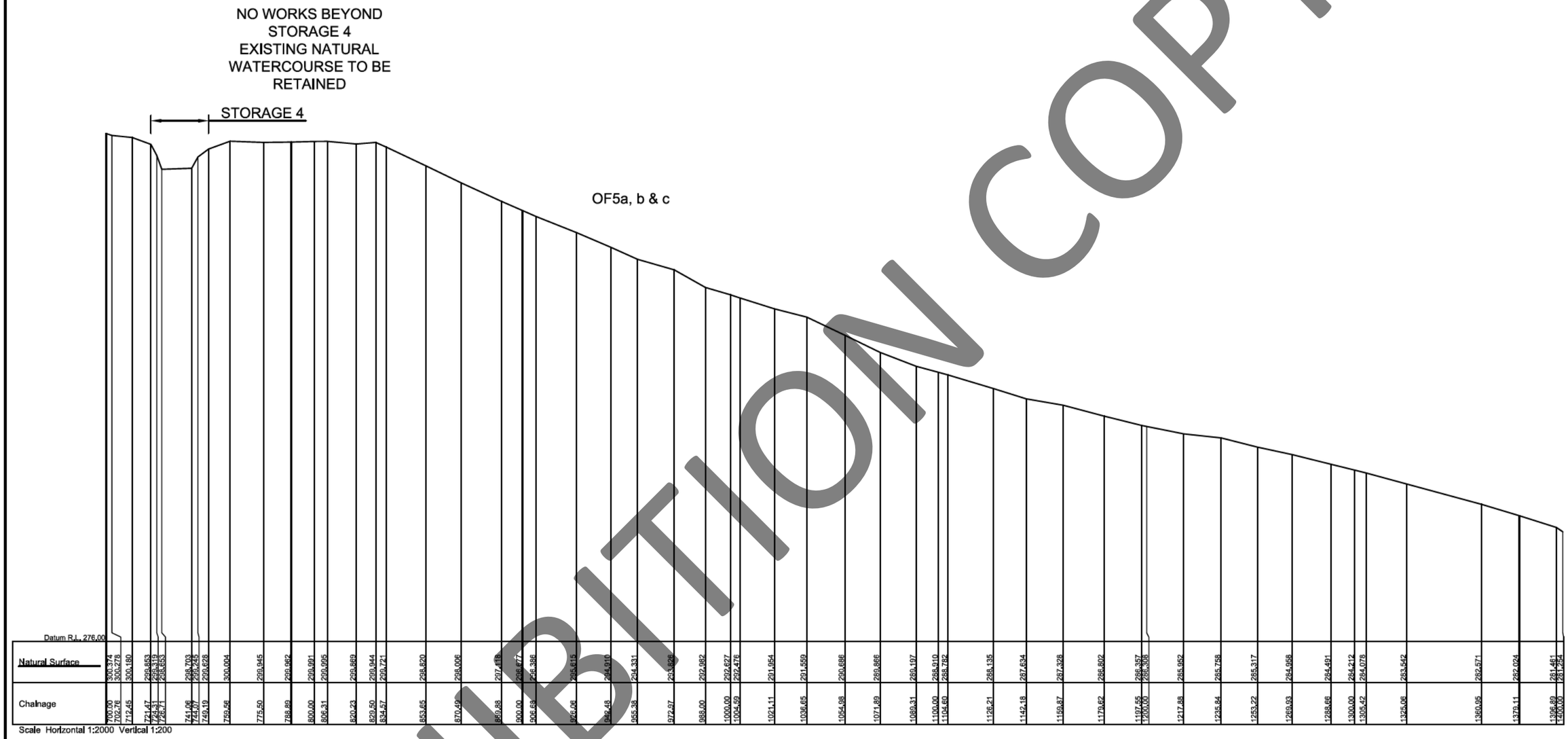

WATERWAY LONGITUDINAL SECTION CHAINAGE 700.00 - 1400.00

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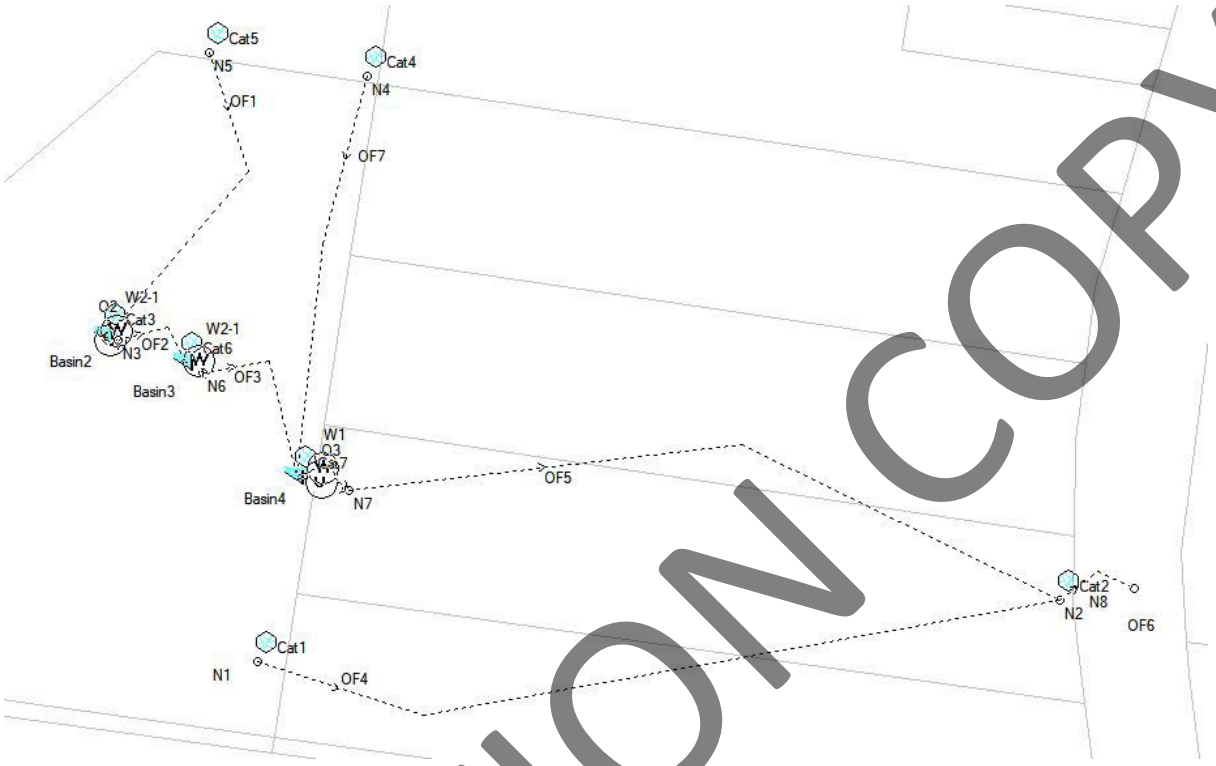
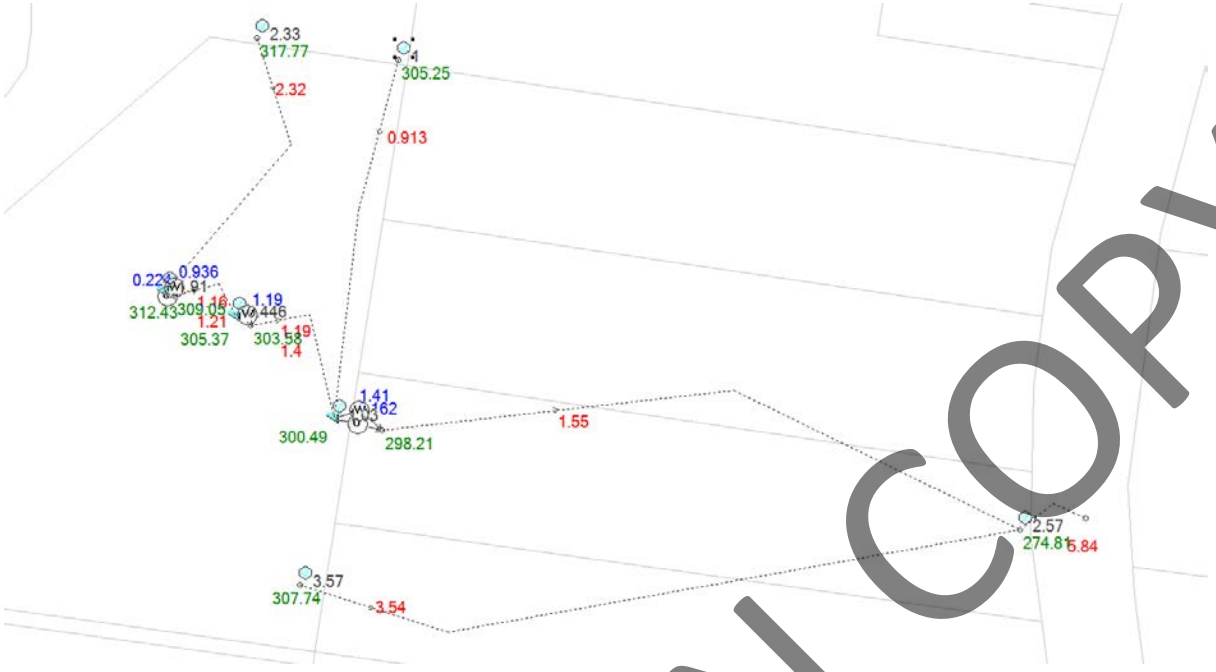
PROJECT: MERRILANDS HEIGHTS ESTATE				
Date: 5 AUGUST 2025	File Ref: 5714	Drawn: KS	Scale: 1:2000	Sheet: 5

APPENDIX B

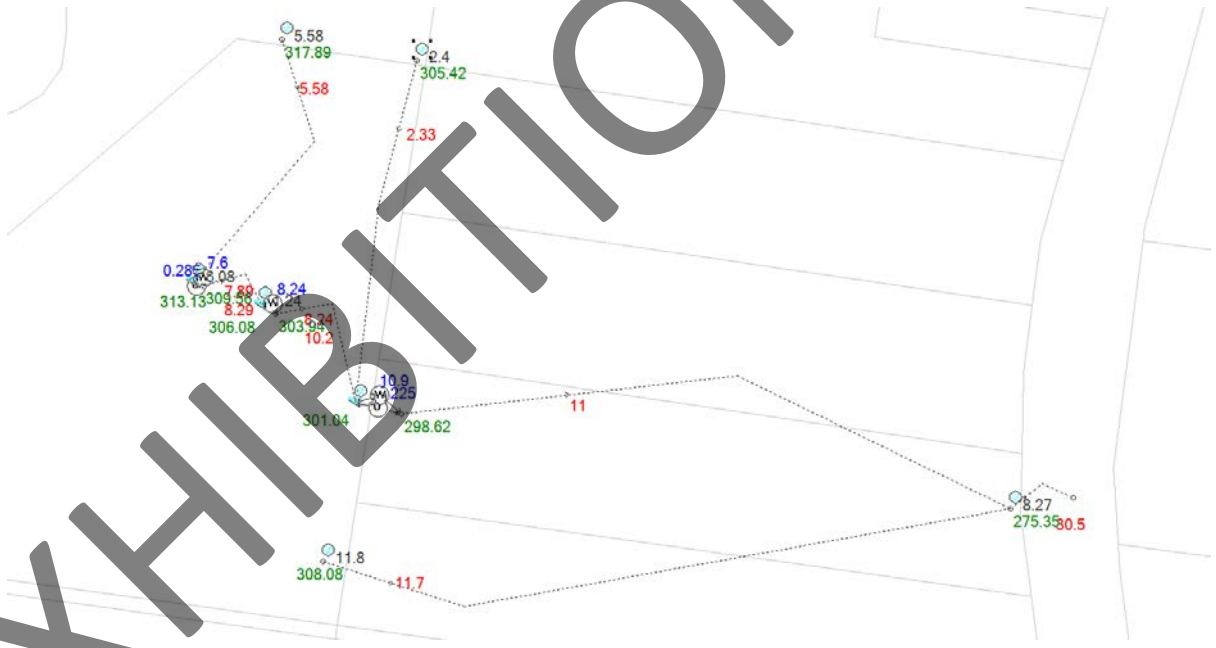
ENGINEERING STORMWATER CALUCLATIONS – DRAINS MODEL



1 in 5 year event:



1 in 100 year event:



PIT / NODE DETAILS Version 15

Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss	Inflow Hydrograph	Pit is	Internal Width (mm)	Inflow is Misaligned	Minor Safe Pond Dept (m)	Major Safe Pond Depth (m)
N1	Node							0		238592.4	6565244		4		No					
N2	Node							0		239593.7	6565320		7		No					
N4	Node							0		238729.3	6565973		9		No					
N5	Node							0		238533	6566003		10		No					
N8	Node							0		239685.9	6565336		20		No					
N7	Node							0		238706.3	6565458		12		No					
N6	Node							0		238524	6565604		11		No					
N3	Node							0		238417.9	6565644		8		No					

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Not Used	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length	id
Basin2	308.7	5		None						238404.2	6565650	No			1390
	308.8	438													
	308.9	748.8													
	309	797.8													
	309.1	835													
	309.2	872.9													
	309.3	911.5													
	309.4	950.9													
	309.5	990.9													
	309.6	1031.7													
	309.7	1073.3													
	309.8	1116.8													
	309.9	1168.8													
	310	1222.6													
	310.1	1277.5													
	310.2	1333.6													
	310.3	1390.7													
	310.4	1486.9													
	310.5	1584.7													
	310.6	1676.7													
	310.7	1765.7													
	310.8	1846.1													
	310.9	1926.1													
	311	2007.2													
	311.1	2089.3													
	311.2	2173.9													
	311.3	2264.7													
	311.4	2402													
	311.5	2572.2													
	312.5	3506													
Basin3	303.4	5		None						238503.2	6565617	No			1391
	303.5	94.7													
	303.6	142.6													
	303.7	167.6													
	303.8	194.1													
	303.9	222													
	304	251.3													
	304.1	282.1													
	304.2	314.3													
	304.3	347.9													

	304.4	382.9																					
	304.5	418.6																					
	304.6	448.3																					
	304.7	478.6																					
	304.8	509.7																					
	304.9	542.1																					
	305	576.6																					
	305.1	617.8																					
	305.2	667.2																					
	305.3	721																					
	305.4	778.1																					
Basin4	298.1	5	None									238640.6	6565475	No					1392				
	298.2	57.5																					
	298.3	133.6																					
	298.4	228.1																					
	298.5	341.2																					
	298.6	472.8																					
	298.7	590.8																					
	298.8	626																					
	298.9	661.6																					
	299	698																					
	299.1	735.1																					
	299.2	772.9																					
	299.3	812.2																					
	299.4	855.1																					
	299.5	900.6																					
	299.6	947.8																					
	299.7	1000.1																					
	299.8	1058.9																					
	299.9	1125.4																					
	300	1200.5																					
	301	4060																					

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp Area %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%) %	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor	Gutter Length (m)	Gutter Slope %	Gutter FlowFactor	Rainfall Multiplier
Cat1	N1	114.077	0	100	0	47	47	47										0				1
Cat2	N2	65.4557	5	95	0	38	38	38										0				1
Cat4	N4	8.7465	30	70	0	13	13	13										0				1
Cat5	N5	22.5022	30	70	0	15	15	15										0				1
Cat3	Basin2	42.1058	5	95	0	32	32	32										0				1
Cat6	Basin3	5.5079	5	95	0	15	15	12										0				1
Cat7	Basin4	17.862	5	95	0	24	24	24										0				1

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	Rl (m)	Chg (m)	RL (m)	etc (m)

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of S (m)	Chg (m)	Bottom Elev (m)	Height of S (m)	Chg (m)	Bottom Elev (m)	Height of S (m)	etc	etc

CHANNEL DETAILS

Name	From	To	Type	Length	U/S IL	D/S IL	Slope	Base Width	L.B. Slope	R.B. Slope	Manning	Depth	Roofed

			(m)	(m)	(m)	(%)	(m)	(1:?)	(1:?)	n	(m)				
OVERFLOW ROUTE DETAILS															
Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Stor (m)	SafeDepth Minor Stor (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id	U/S IL	D/S IL	Length (m)
OF4	N1	N2	5.2				Channel	2.5	2.5	0.6	1	0	24	307.357	300.835	400
OF6	N2	N8	0.1				Channel	2.5	2.5	0.6	1	100	26	274.422	274	10
OF7	N4	Basin4	6.4				Channel	2.5	2.5	0.6	1	0	29	304.995	302.704	470
OF1	N5	Basin2	6.5				4 m wide p	0.3	0.15	0.4	1	0	21	317.588	311.1	190
OF5	N7	N2	17				Channel	2.5	2.5	0.6	1	0	25	298	274.422	930
OF3	N6	Basin4	3.5				Channel	2.5	2.5	0.6	1	100	23	303.4	298.641	200
OF2	N3	Basin3	1.5				Channel	2.5	2.5	0.6	1	100	22	308.7	308.6	66

PIPE COVER DETAILS

Name	Type	Dia (mm)	Safe Cover	Cover (m)

This model has no pipes with non-return valves

DRAINS results prepared from Version 2023.02.8444.20204

PIT / NODE DETAILS Version 8

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivi (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N1	307.74		3.57				
N2	274.81		6.021				
N4	305.25		1				
N5	317.77		2.328				
N7	298.21		0				
N6	303.58		0				
N3	309.05		0				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Cat1	3.57	0	3.57	47	47	47	AR&R 5 year, 2 hours storm, average 20.8 mm/h, Zone 2
Cat2	2.569	0.408	2.162	38	38	38	AR&R 5 year, 1 hour storm, average 33.1 mm/h, Zone 2
Cat4	1	0.686	0.333	13	13	13	AR&R 5 year, 25 minutes storm, average 55.0 mm/h, Zone 2
Cat5	2.328	1.506	1.147	15	15	15	AR&R 5 year, 1 hour storm, average 33.1 mm/h, Zone 2
Cat3	1.91	0.29	1.651	32	32	32	AR&R 5 year, 1 hour storm, average 33.1 mm/h, Zone 2
Cat6	0.446	0.053	0.41	15	15	12	AR&R 5 year, 1 hour storm, average 33.1 mm/h, Zone 2
Cat7	1.033	0.142	0.934	24	24	24	AR&R 5 year, 1 hour storm, average 33.1 mm/h, Zone 2

Outflow Volumes for Total Catchment (17.5 impervious + 259 pervious = 276 total ha)

Storm	Total Rainf cu.m	Total Runo cu.m (Runc	Imperviou cu.m (Runc	Pervious Runoff cu.m (Runoff %)
AR&R 5 ye	26474.64	1325.83 (5	1325.83 (7	0.00 (0.0%)
AR&R 5 ye	40057.28	2533.14 (6	2185.46 (8	347.68 (0.9%)
AR&R 5 ye	49726.27	4844.14 (9	2797.31 (8	2046.83 (4.4%)
AR&R 5 ye	57093.14	7375.40 (1	3259.10 (9	4116.30 (7.7%)
AR&R 5 ye	63308.91	10165.37 (	3638.01 (9	6527.36 (11.0%)
AR&R 5 ye	68788.02	12531.18 (	3951.08 (9	8580.10 (13.3%)
AR&R 5 ye	81633.97	19072.99 (	4810.36 (9	14262.63 (18.7%)
AR&R 5 ye	91441.09	24285.52 (	5437.38 (9	18848.14 (22.0%)
AR&R 5 ye	104837.3	27644.51 (	6285.22 (9	21359.28 (21.8%)
AR&R 5 ye	114925.2	30538.16 (	6923.66 (9	23614.50 (21.9%)
AR&R 5 ye	130945.8	33141.41 (	7937.57 (9	25203.84 (20.5%)
AR&R 5 ye	149178.8	35199.92 (	9091.48 (9	26108.44 (18.7%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF4	3.541	3.54	4.133	0.379	0.56	8.04	1.65	AR&R 5 year, 3 hours storm, average 15.8 mm/h, Zone 2
OF6	5.837	5.837	4.133	0.383	0.89	8.06	2.33	AR&R 5 year, 3 hours storm, average 15.8 mm/h, Zone 2
OF7	0.913	0.903	4.133	0.257	0.16	7.06	1.13	AR&R 5 year, 1 hour storm, average 33.1 mm/h, Zone 2
OF1	2.321	2.323	0.908	1.33	0.63	4	3.51	AR&R 5 year, 1 hour storm, average 33.1 mm/h, Zone 2
O2	0.224	0.224						AR&R 5 year, 3 hours storm, average 15.8 mm/h, Zone 2
W2-1	0.936	0.936						AR&R 5 year, 3 hours storm, average 15.8 mm/h, Zone 2
W2-1	1.185	1.185						AR&R 5 year, 3 hours storm, average 15.8 mm/h, Zone 2
O3	0.162	0.162						AR&R 5 year, 2 hours storm, average 20.8 mm/h, Zone 2
W1	1.412	1.412						AR&R 5 year, 2 hours storm, average 20.8 mm/h, Zone 2
OF5	1.552	1.563	4.133	0.383	0.27	8.06	1.28	AR&R 5 year, 2 hours storm, average 20.8 mm/h, Zone 2
OF3	1.185	1.398	4.133	1.849	0.21	19.8	1.14	AR&R 5 year, 3 hours storm, average 15.8 mm/h, Zone 2
OF2	1.158	1.208	4.133	0.346	0.21	7.77	1.23	AR&R 5 year, 3 hours storm, average 15.8 mm/h, Zone 2

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
Basin2	312.43	6643.8	1.159	0	1.159
Basin3	305.37	751.9	1.185	0	1.185
Basin4	300.49	2124.6	1.574	0	1.574

CONTINUITY CHECK for AR&R 5 year, 2 hours storm, average 20.8 mm/h, Zone 2

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Ch (cu.m)	Difference %
N1	10350.61	9854.15	0	4.8
N2	22222.17	22209.83	0	0.1
N4	1736.79	1384.11	0	20.3

N5	4467.71	4404.19	0	1.4
N8	22220.44	22220.44	0	0
Basin2	8954.31	3649.39	5305.45	0
Basin3	4188.35	3572.72	616.18	0
Basin4	6905.8	5139.94	1766.47	0
N7	5139.94	4399.58	0	14.4
N6	3572.72	2599.17	0	27.2
N3	3649.39	3340.46	0	8.5

Run Log for Avard_ Basins_Stage2
{\colortbl;\red0\green0\blue0;\red192\green0\blue0;}Run Log for Avard_ Basins_Stage2.drn - DRAINS run at 20:37:37 on 27/8/2025 using Watercom Drains v2023.02.8444.20204

The maximum flow in these overflow routes is unsafe: OF6, OF1

(1)

DAM 1
(THICKNESS NEAR SUBDIV)

COMPUTATION VIA PRISMS

SURFACES:
==========
Design: 319.500 (m)
Natural: 5714_GDIST_220803_DESIGN - DTM-DRAINAGE

REGION:
=======
Boundary: BDY DAM 1

SURFACE AREAS:
=============
Design: 1177.8 (square meters)
Natural: 1205.7 (square meters)

PLAN AREAS:
=============
Boundary: 1181.4 (square meters) within the boundary
Design: 1177.8 (square meters) within the boundary and within design surface
Natural: 1177.8 (square meters)

Factor:
=======================
Swell: 1.000
Shrink: 1.000

CUT/FILL/MATCHING AREAS:
========================
Cut: 613.3 (square meters)
Fill: 564.5 (square meters)
Matching: 0.0 (square meters)
Total Area: 1177.8 (square meters)

WARNING - There is a difference between volumes area and boundary area.
Cut 3D: 627.2 (square meters)
Fill 3D: 578.4 (square meters)
Matching 3D: 0.0 (square meters)
Total Area 3D: 1205.7 (square meters)

VOLUMES:
==========
Cut to Fill Ratio: 1.003
Cut: 553.632 (cubic meters)
Fill: 552.247 (cubic meters)
Net: 1.386 (cubic meters) [cut]

Cut: 0.903 (cubic meters) / (square meters)
Fill: 0.978 (cubic meters) / (square meters)

Average Cut Depth: 0.903 (m)
Maximum Cut Depth: 2.831 (m)
Average Fill Depth: 0.978 (m)
Maximum Fill Depth: 2.494 (m)

Dam 1 (2)

COMPUTATION VIA SLICED PRISMS

REGION:
==========
Boundary: BDY DAM 1

SLICES PARAMETERS:
==========
Slices Interval: 0.100 (m)
Number of Slices: 54

VOLUMES SLICE-BY-SLICE:
==========

From Rl	To Rl	Cut Vol	Cumulative Cut	Fill Vol	Cumulative Fill	Net Vol	Cumulative Net	Slice	Cut Area	Slice Fill Area	
317.01	317.10	0.0	0.0	0.3	0.3	0.3F	0.3F	0.0		7.8	
317.10	317.20	0.0	0.0	1.4	1.7	1.4F	1.7F	0.0		19.6	

317.20	317.30	0.0	0.0	2.7	4.4	2.7F	4.4F	0.0		35.0	← BASE DAM
317.30	317.40	0.0	0.0	4.1	8.4	4.1F	8.4F	0.0		46.1	
317.40	317.50	0.0	0.0	5.2	13.6	5.2F	13.6F	0.0		58.3	
317.50	317.60	0.0	0.0	6.5	20.1	6.5F	20.1F	0.0		71.6	
317.60	317.70	0.0	0.0	7.9	28.0	7.9F	28.0F	0.0		86.1	
317.70	317.80	0.0	0.0	9.4	37.4	9.4F	37.4F	0.0		101.9	
317.80	317.90	0.0	0.0	11.0	48.4	11.0F	48.4F	0.0		119.0	
317.90	318.00	0.0	0.0	12.8	61.2	12.8F	61.2F	0.0		137.4	
318.00	318.10	0.0	0.0	14.7	76.0	14.7F	76.0F	0.0		157.2	
318.10	318.20	0.0	0.0	16.8	92.7	16.8F	92.7F	0.0		178.1	
318.20	318.30	0.0	0.0	18.9	111.6	18.9F	111.6F	0.0		200.2	
318.30	318.40	0.0	0.0	21.2	132.8	21.2F	132.8F	0.0		223.5	
318.40	318.50	0.0	0.0	23.6	156.4	23.6F	156.4F	0.0		247.9	
318.50	318.60	0.0	0.0	26.1	182.5	26.1F	182.5F	0.0		274.3	
318.60	318.70	0.0	0.0	28.8	211.3	28.8F	211.3F	0.0		302.6	
318.70	318.80	0.0	0.0	31.7	243.0	31.7F	243.0F	0.0		331.2	← 200mm PIPE
318.80	318.90	0.0	0.0	34.6	277.5	34.6F	277.5F	0.0		359.9	
318.90	319.00	0.0	0.0	37.5	315.0	37.5F	315.0F	0.0		390.0	
319.00	319.10	0.0	0.0	40.6	355.6	40.6F	355.6F	0.0		422.1	
319.10	319.20	0.0	0.0	43.9	399.5	43.9F	399.5F	0.0		455.8	
319.20	319.30	0.0	0.0	47.3	446.8	47.3F	446.8F	0.0		490.7	
319.30	319.40	0.0	0.0	50.9	497.7	50.9F	497.7F	0.0		527.0	
319.40	319.50	0.0	0.0	54.6	552.2	54.6F	552.2F	0.0		564.5	
319.50	319.60	59.4	59.4	0.0	552.2	59.4C	492.9F	574.6		0.0	← SPILWAY
319.60	319.70	55.5	114.9	0.0	552.2	55.5C	437.3F	535.9		0.0	
319.70	319.80	51.6	166.6	0.0	552.2	51.6C	385.7F	496.6		0.0	
319.80	319.90	47.4	214.0	0.0	552.2	47.4C	338.3F	446.5		0.0	
319.90	320.00	41.3	255.3	0.0	552.2	41.3C	297.0F	385.1		0.0	
320.00	320.10	36.2	291.5	0.0	552.2	36.2C	260.8F	341.1		0.0	
320.10	320.20	32.3	323.7	0.0	552.2	32.3C	228.5F	304.9		0.0	
320.20	320.30	28.6	352.4	0.0	552.2	28.6C	199.9F	271.0		0.0	
320.30	320.40	26.0	378.3	0.0	552.2	26.0C	173.9F	248.7		0.0	
320.40	320.50	23.8	402.2	0.0	552.2	23.8C	150.1F	227.8		0.0	
320.50	320.60	21.8	423.9	0.0	552.2	21.8C	128.3F	207.5		0.0	
320.60	320.70	19.7	443.7	0.0	552.2	19.7C	108.6F	187.5		0.0	
320.70	320.80	17.8	461.4	0.0	552.2	17.8C	90.8F	168.3		0.0	
320.80	320.90	15.9	477.3	0.0	552.2	15.9C	74.9F	149.7		0.0	
320.90	321.00	14.1	491.4	0.0	552.2	14.1C	60.8F	131.9		0.0	
321.00	321.10	12.3	503.7	0.0	552.2	12.3C	48.5F	114.7		0.0	
321.10	321.20	10.6	514.4	0.0	552.2	10.6C	37.9F	98.1		0.0	
321.20	321.30	9.0	523.4	0.0	552.2	9.0C	28.9F	82.1		0.0	

Dom 1 (3)

321.30 321.40	7.4	530.8	0.0	552.2	7.4C	21.4F	66.5	0.0
321.40 321.50	6.0	536.8	0.0	552.2	6.0C	15.5F	53.7	0.0
321.50 321.60	4.8	541.6	0.0	552.2	4.8C	10.6F	43.1	0.0
321.60 321.70	3.8	545.4	0.0	552.2	3.8C	6.8F	33.5	0.0
321.70 321.80	2.9	548.4	0.0	552.2	2.9C	3.9F	25.4	0.0
321.80 321.90	2.2	550.6	0.0	552.2	2.2C	1.7F	18.4	0.0
321.90 322.00	1.5	552.1	0.0	552.2	1.5C	0.2F	12.3	0.0
322.00 322.10	1.0	553.1	0.0	552.2	1.0C	0.8C	7.2	0.0
322.10 322.20	0.5	553.5	0.0	552.2	0.5C	1.3C	2.4	0.0
322.20 322.30	0.1	553.6	0.0	552.2	0.1C	1.4C	0.1	0.0
322.30 322.33	0.0	553.6	0.0	552.2	0.0C	1.4C	0.0	0.0

TOTAL VOLUMES:
==========

Cut:	553.632	(cubic meters)
Fill:	552.247	(cubic meters)
Net:	1.386	(cubic meters) [cut]

(1)

DAM 2

COMPUTATION VIA PRISMS

SURFACES:
==========
Design: 311.500 (m)
Natural: 5714_GDIST_220803_DESIGN - DTM-DRAINAGE

REGION:
=======
Boundary: BDY DAM 2

SURFACE AREAS:
=============
Design: 3430.5 (square meters)
Natural: 3515.4 (square meters)

PLAN AREAS:
=============
Boundary: 3430.5 (square meters) within the boundary
Design: 3430.5 (square meters) within the boundary and within design surface
Natural: 3430.5 (square meters)

Factor:
========================
Swell: 1.000
Shrink: 1.000

CUT/FILL/MATCHING AREAS:
========================
Cut: 858.3 (square meters)
Fill: 2572.2 (square meters)
Matching: 0.0 (square meters)
Total Area: 3430.5 (square meters)
Cut 3D: 891.1 (square meters)
Fill 3D: 2624.4 (square meters)
Matching 3D: 0.0 (square meters)
Total Area 3D: 3515.4 (square meters)

VOLUMES:
==========
Cut to Fill Ratio: 0.207
Cut: 799.918 (cubic meters)
Fill: 3869.592 (cubic meters)
Net: 3069.675 (cubic meters) [fill]

Cut: 0.932 (cubic meters) / (square meters)
Fill: 1.504 (cubic meters) / (square meters)

Average Cut Depth: 0.932 (m)
Maximum Cut Depth: 4.247 (m)
Average Fill Depth: 1.504 (m)
Maximum Fill Depth: 2.800 (m)

Dam 2 (2)

COMPUTATION VIA SLICED PRISMS

REGION:
==========
Boundary: BDY DAM 2

SLICES PARAMETERS:
==========
Slices Interval: 0.100 (m)
Number of Slices: 71

VOLUMES SLICE-BY-SLICE:
==========

From RL	To RL	Cut Vol	Cumulative Cut	Fill Vol	Cumulative Fill	Net Vol	Cumulative Net	Slice Cut Area	Slice Fill Area	
308.70	308.80	0.0	0.0	19.4	19.4	19.4F	19.4F	0.0	438.0	← BASE DAM
308.80	308.90	0.0	0.0	63.7	83.1	63.7F	83.1F	0.0	748.8	
308.90	309.00	0.0	0.0	77.7	160.8	77.7F	160.8F	0.0	797.8	
309.00	309.10	0.0	0.0	81.6	242.4	81.6F	242.4F	0.0	835.0	
309.10	309.20	0.0	0.0	85.4	327.8	85.4F	327.8F	0.0	872.9	
309.20	309.30	0.0	0.0	89.2	417.0	89.2F	417.0F	0.0	911.5	
309.30	309.40	0.0	0.0	93.1	510.1	93.1F	510.1F	0.0	950.9	
309.40	309.50	0.0	0.0	97.1	607.2	97.1F	607.2F	0.0	990.9	
309.50	309.60	0.0	0.0	101.1	708.3	101.1F	708.3F	0.0	1031.7	
309.60	309.70	0.0	0.0	105.2	813.6	105.2F	813.6F	0.0	1073.3	
309.70	309.80	0.0	0.0	109.5	923.1	109.5F	923.1F	0.0	1116.8	
309.80	309.90	0.0	0.0	114.2	1037.3	114.2F	1037.3F	0.0	1168.8	
309.90	310.00	0.0	0.0	119.6	1156.9	119.6F	1156.9F	0.0	1222.6	
310.00	310.10	0.0	0.0	125.0	1281.9	125.0F	1281.9F	0.0	1277.5	
310.10	310.20	0.0	0.0	130.5	1412.4	130.5F	1412.4F	0.0	1333.6	
310.20	310.30	0.0	0.0	136.2	1548.6	136.2F	1548.6F	0.0	1390.7	
310.30	310.40	0.0	0.0	143.5	1692.1	143.5F	1692.1F	0.0	1486.9	
310.40	310.50	0.0	0.0	153.6	1845.7	153.6F	1845.7F	0.0	1584.7	
310.50	310.60	0.0	0.0	163.1	2008.8	163.1F	2008.8F	0.0	1676.7	← 600mm PIPE
310.60	310.70	0.0	0.0	172.1	2180.9	172.1F	2180.9F	0.0	1765.7	
310.70	310.80	0.0	0.0	180.6	2361.6	180.6F	2361.6F	0.0	1846.1	
310.80	310.90	0.0	0.0	188.6	2550.2	188.6F	2550.2F	0.0	1926.1	
310.90	311.00	0.0	0.0	196.7	2746.8	196.7F	2746.8F	0.0	2007.2	
311.00	311.10	0.0	0.0	204.8	2951.6	204.8F	2951.6F	0.0	2089.3	
311.10	311.20	0.0	0.0	213.1	3164.8	213.1F	3164.8F	0.0	2173.9	
311.20	311.30	0.0	0.0	221.8	3386.5	221.8F	3386.5F	0.0	2264.7	
311.30	311.40	0.0	0.0	233.0	3619.5	233.0F	3619.5F	0.0	2402.0	
311.40	311.50	0.0	0.0	250.1	3869.6	250.1F	3869.6F	0.0	2572.2	← SPILLWAY
311.50	311.60	80.2	80.2	0.0	3869.6	80.2C	3789.4F	750.1	0.0	
311.60	311.70	70.6	150.8	0.0	3869.6	70.6C	3718.8F	663.5	0.0	
311.70	311.80	62.4	213.2	0.0	3869.6	62.4C	3656.4F	585.3	0.0	
311.80	311.90	55.1	268.3	0.0	3869.6	55.1C	3601.3F	518.0	0.0	
311.90	312.00	48.9	317.2	0.0	3869.6	48.9C	3552.4F	461.8	0.0	
312.00	312.10	43.8	361.0	0.0	3869.6	43.8C	3508.6F	417.4	0.0	
312.10	312.20	40.0	401.0	0.0	3869.6	40.0C	3468.6F	383.3	0.0	
312.20	312.30	36.8	437.8	0.0	3869.6	36.8C	3431.8F	352.4	0.0	
312.30	312.40	33.8	471.5	0.0	3869.6	33.8C	3398.1F	323.4	0.0	
312.40	312.50	31.0	502.5	0.0	3869.6	31.0C	3367.1F	296.5	0.0	

Adm 2 (3)

312.50 312.60	28.4	530.9	0.0	3869.6	28.4C	3338.7F	271.5	0.0
312.60 312.70	26.0	556.9	0.0	3869.6	26.0C	3312.7F	248.3	0.0
312.70 312.80	23.8	580.6	0.0	3869.6	23.8C	3289.0F	227.0	0.0

312.80 312.90	21.7	602.3	0.0	3869.6	21.7C	3267.3F	207.5	0.0
312.90 313.00	19.8	622.1	0.0	3869.6	19.8C	3247.5F	188.9	0.0
313.00 313.10	18.0	640.1	0.0	3869.6	18.0C	3229.5F	171.2	0.0
313.10 313.20	16.3	656.4	0.0	3869.6	16.3C	3213.2F	154.6	0.0
313.20 313.30	14.7	671.1	0.0	3869.6	14.7C	3198.5F	139.7	0.0
313.30 313.40	13.4	684.5	0.0	3869.6	13.4C	3185.1F	127.9	0.0
313.40 313.50	12.3	696.7	0.0	3869.6	12.3C	3172.9F	117.7	0.0
313.50 313.60	11.3	708.0	0.0	3869.6	11.3C	3161.6F	108.1	0.0
313.60 313.70	10.4	718.4	0.0	3869.6	10.4C	3151.2F	99.3	0.0
313.70 313.80	9.5	727.9	0.0	3869.6	9.5C	3141.7F	91.3	0.0
313.80 313.90	8.8	736.7	0.0	3869.6	8.8C	3132.9F	84.1	0.0
313.90 314.00	8.1	744.7	0.0	3869.6	8.1C	3124.9F	77.7	0.0
314.00 314.10	7.5	752.2	0.0	3869.6	7.5C	3117.4F	71.7	0.0
314.10 314.20	6.9	759.1	0.0	3869.6	6.9C	3110.5F	65.8	0.0
314.20 314.30	6.3	765.4	0.0	3869.6	6.3C	3104.2F	60.0	0.0
314.30 314.40	5.7	771.1	0.0	3869.6	5.7C	3098.5F	54.3	0.0
314.40 314.50	5.2	776.2	0.0	3869.6	5.2C	3093.4F	48.8	0.0
314.50 314.60	4.6	780.8	0.0	3869.6	4.6C	3088.8F	43.4	0.0
314.60 314.70	4.1	784.9	0.0	3869.6	4.1C	3084.7F	38.1	0.0
314.70 314.80	3.5	788.5	0.0	3869.6	3.5C	3081.1F	32.9	0.0
314.80 314.90	3.0	791.5	0.0	3869.6	3.0C	3078.1F	27.8	0.0
314.90 315.00	2.5	794.0	0.0	3869.6	2.5C	3075.6F	22.9	0.0
315.00 315.10	2.0	796.1	0.0	3869.6	2.0C	3073.5F	18.1	0.0
315.10 315.20	1.6	797.6	0.0	3869.6	1.6C	3071.9F	13.4	0.0
315.20 315.30	1.1	798.8	0.0	3869.6	1.1C	3070.8F	8.8	0.0
315.30 315.40	0.7	799.4	0.0	3869.6	0.7C	3070.2F	4.7	0.0
315.40 315.50	0.3	799.7	0.0	3869.6	0.3C	3069.8F	2.1	0.0
315.50 315.60	0.1	799.9	0.0	3869.6	0.1C	3069.7F	0.7	0.0
315.60 315.70	0.0	799.9	0.0	3869.6	0.0C	3069.7F	0.1	0.0
315.70 315.75	0.0	799.9	0.0	3869.6	0.0C	3069.7F	0.0	0.0

TOTAL VOLUMES:
==========

Cut:	799.918 (cubic meters)
Fill:	3869.592 (cubic meters)
Net:	3069.675 (cubic meters) [fill]

DAM 3 (1)

COMPUTATION VIA PRISMS

SURFACES:
==========
Design: 305.400 (m)
Natural: 5714_GDIST_220803_DESIGN - DTM-DRAINAGE

REGION:
=======
Boundary: BDY DAM 3

SURFACE AREAS:
=============
Design: 1203.3 (square meters)
Natural: 1230.1 (square meters)

PLAN AREAS:
=============
Boundary: 1203.3 (square meters) within the boundary
Design: 1203.3 (square meters) within the boundary and within design surface
Natural: 1203.3 (square meters)

Factor:
========================
Swell: 1.000
Shrink: 1.000

CUT/FILL/MATCHING AREAS:
========================
Cut: 425.2 (square meters)
Fill: 778.1 (square meters)
Matching: 0.0 (square meters)
Total Area: 1203.3 (square meters)
Cut 3D: 434.3 (square meters)
Fill 3D: 795.8 (square meters)
Matching 3D: 0.0 (square meters)
Total Area 3D: 1230.1 (square meters)

VOLUMES:
==========
Cut to Fill Ratio: 0.163
Cut: 126.485 (cubic meters)
Fill: 774.582 (cubic meters)
Net: 648.097 (cubic meters) [fill]

Cut: 0.297 (cubic meters) / (square meters)
Fill: 0.996 (cubic meters) / (square meters)

Average Cut Depth: 0.297 (m)
Maximum Cut Depth: 0.866 (m)
Average Fill Depth: 0.996 (m)
Maximum Fill Depth: 1.946 (m)

Dam 3 (2)

COMPUTATION VIA SLICED PRISMS

REGION:
==========
Boundary: BDY DAM 3

SLICES PARAMETERS:
==========
Slices Interval: 0.100 (m)
Number of Slices: 29

VOLUMES SLICE-BY-SLICE:
==========

From RL	To RL	Cut Vol	Cumulative Cut	Fill Vol	Cumulative Fill	Net Vol	Cumulative Net	Slice	Cut Area	Slice Fill Area	
303.45	303.50	0.0	0.0	1.9	1.9	1.9F	1.9F	0.0		94.7	← BASE DAM
303.50	303.60	0.0	0.0	12.9	14.8	12.9F	14.8F	0.0		142.6	
303.60	303.70	0.0	0.0	15.5	30.3	15.5F	30.3F	0.0		167.6	
303.70	303.80	0.0	0.0	18.1	48.3	18.1F	48.3F	0.0		194.1	
303.80	303.90	0.0	0.0	20.8	69.1	20.8F	69.1F	0.0		222.0	
303.90	304.00	0.0	0.0	23.7	92.8	23.7F	92.8F	0.0		251.3	
304.00	304.10	0.0	0.0	26.7	119.4	26.7F	119.4F	0.0		282.1	
304.10	304.20	0.0	0.0	29.8	149.2	29.8F	149.2F	0.0		314.3	
304.20	304.30	0.0	0.0	33.1	182.3	33.1F	182.3F	0.0		347.9	
304.30	304.40	0.0	0.0	36.5	218.9	36.5F	218.9F	0.0		382.9	
304.40	304.50	0.0	0.0	40.1	259.0	40.1F	259.0F	0.0		418.6	
304.50	304.60	0.0	0.0	43.4	302.3	43.4F	302.3F	0.0		448.3	
304.60	304.70	0.0	0.0	46.3	348.7	46.3F	348.7F	0.0		478.6	
304.70	304.80	0.0	0.0	49.4	398.1	49.4F	398.1F	0.0		509.7	
304.80	304.90	0.0	0.0	52.6	450.6	52.6F	450.6F	0.0		542.1	
304.90	305.00	0.0	0.0	55.9	506.6	55.9F	506.6F	0.0		576.6	
305.00	305.10	0.0	0.0	59.6	566.1	59.6F	566.1F	0.0		617.8	
305.10	305.20	0.0	0.0	64.2	630.3	64.2F	630.3F	0.0		667.2	
305.20	305.30	0.0	0.0	69.4	699.7	69.4F	699.7F	0.0		721.0	
305.30	305.40	0.0	0.0	74.9	774.6	74.9F	774.6F	0.0		778.1	← SPILWAY
305.40	305.50	39.3	39.3	0.0	774.6	39.3C	735.3F	356.1		0.0	
305.50	305.60	30.7	70.0	0.0	774.6	30.7C	704.6F	258.8		0.0	
305.60	305.70	22.2	92.2	0.0	774.6	22.2C	682.3F	189.3		0.0	
305.70	305.80	15.9	108.1	0.0	774.6	15.9C	666.5F	129.3		0.0	
305.80	305.90	10.4	118.5	0.0	774.6	10.4C	656.1F	79.1		0.0	
305.90	306.00	5.7	124.2	0.0	774.6	5.7C	650.4F	36.4		0.0	
306.00	306.10	2.0	126.2	0.0	774.6	2.0C	648.4F	6.8		0.0	
306.10	306.20	0.3	126.5	0.0	774.6	0.3C	648.1F	0.8		0.0	
306.20	306.27	0.0	126.5	0.0	774.6	0.0C	648.1F	0.0		0.0	

TOTAL VOLUMES:
==========
Cut: 126.485 (cubic meters)
Fill: 774.582 (cubic meters)
Net: 648.097 (cubic meters) [fill]

Dam 4 (1)

COMPUTATION VIA PRISMS

SURFACES:
==========
Design: 300.000 (m)
Natural: 5714_GDIST_220803_DESIGN - DTM-DRAINAGE

REGION:
=======
Boundary: BDY DAM 4

SURFACE AREAS:
=============
Design: 1998.7 (square meters)
Natural: 2039.5 (square meters)

PLAN AREAS:
=============
Boundary: 1998.7 (square meters) within the boundary
Design: 1998.7 (square meters) within the boundary and within design surface
Natural: 1998.7 (square meters)

Factor:
=======================
Swell: 1.000
Shrink: 1.000

CUT/FILL/MATCHING AREAS:
========================
Cut: 798.2 (square meters)
Fill: 1200.5 (square meters)
Matching: 0.0 (square meters)
Total Area: 1998.7 (square meters)
Cut 3D: 817.2 (square meters)
Fill 3D: 1222.3 (square meters)
Matching 3D: 0.0 (square meters)
Total Area 3D: 2039.5 (square meters)

VOLUMES:
==========
Cut to Fill Ratio: 0.335
Cut: 422.274 (cubic meters)
Fill: 1261.576 (cubic meters)
Net: 839.302 (cubic meters) [fill]

Cut: 0.529 (cubic meters) / (square meters)
Fill: 1.051 (cubic meters) / (square meters)

Average Cut Depth: 0.529 (m)
Maximum Cut Depth: 1.539 (m)
Average Fill Depth: 1.051 (m)
Maximum Fill Depth: 1.900 (m)

DAM 4 (2)

COMPUTATION VIA SLICED PRISMS

REGION:
Boundary: BDY DAM 4

SLICES PARAMETERS:
Slices Interval: 0.100 (m)
Number of Slices: 35

VOLUMES SLICE-BY-SLICE:

From RL	To RL	Cut Vol	Cumulative Cut	Fill Vol	Cumulative Fill	Net Vol	Cumulative Net	Slice Cut Area	Slice Fill Area	
298.10	298.20	0.0	0.0	2.7	2.7	2.7F	2.7F	0.0	57.5	← BASE DAM
298.20	298.30	0.0	0.0	9.4	12.1	9.4F	12.1F	0.0	133.6	
298.30	298.40	0.0	0.0	17.9	30.1	17.9F	30.1F	0.0	228.1	
298.40	298.50	0.0	0.0	28.3	58.4	28.3F	58.4F	0.0	341.2	
298.50	298.60	0.0	0.0	40.5	98.9	40.5F	98.9F	0.0	472.8	
298.60	298.70	0.0	0.0	54.1	153.0	54.1F	153.0F	0.0	590.8	
298.70	298.80	0.0	0.0	60.9	213.9	60.9F	213.9F	0.0	626.0	
298.80	298.90	0.0	0.0	64.4	278.3	64.4F	278.3F	0.0	661.6	
298.90	299.00	0.0	0.0	68.0	346.2	68.0F	346.2F	0.0	698.0	
299.00	299.10	0.0	0.0	71.6	417.9	71.6F	417.9F	0.0	735.1	
299.10	299.20	0.0	0.0	75.4	493.3	75.4F	493.3F	0.0	772.9	
299.20	299.30	0.0	0.0	79.2	572.5	79.2F	572.5F	0.0	812.2	
299.30	299.40	0.0	0.0	83.3	655.8	83.3F	655.8F	0.0	855.1	
299.40	299.50	0.0	0.0	87.8	743.6	87.8F	743.6F	0.0	900.6	
299.50	299.60	0.0	0.0	92.4	836.0	92.4F	836.0F	0.0	947.8	
299.60	299.70	0.0	0.0	97.3	933.3	97.3F	933.3F	0.0	1000.1	
299.70	299.80	0.0	0.0	102.9	1036.2	102.9F	1036.2F	0.0	1058.9	
299.80	299.90	0.0	0.0	109.2	1145.4	109.2F	1145.4F	0.0	1125.4	
299.90	300.00	0.0	0.0	116.2	1261.6	116.2F	1261.6F	0.0	1200.5	← SPILLWAY
300.00	300.10	75.9	75.9	0.0	1261.6	75.9C	1185.6F	720.5	0.0	
300.10	300.20	68.0	144.0	0.0	1261.6	68.0C	1117.6F	638.3	0.0	
300.20	300.30	58.1	202.1	0.0	1261.6	58.1C	1059.5F	524.3	0.0	
300.30	300.40	48.8	250.9	0.0	1261.6	48.8C	1010.7F	452.4	0.0	
300.40	300.50	41.7	292.6	0.0	1261.6	41.7C	969.0F	382.6	0.0	
300.50	300.60	34.9	327.5	0.0	1261.6	34.9C	934.1F	315.6	0.0	
300.60	300.70	28.4	355.9	0.0	1261.6	28.4C	905.7F	253.3	0.0	
300.70	300.80	22.5	378.4	0.0	1261.6	22.5C	883.2F	197.0	0.0	
300.80	300.90	17.0	395.4	0.0	1261.6	17.0C	866.2F	144.2	0.0	
300.90	301.00	12.0	407.4	0.0	1261.6	12.0C	854.2F	96.9	0.0	
301.00	301.10	7.7	415.1	0.0	1261.6	7.7C	846.5F	58.4	0.0	
301.10	301.20	4.3	419.4	0.0	1261.6	4.3C	842.2F	28.8	0.0	
301.20	301.30	2.0	421.4	0.0	1261.6	2.0C	840.2F	12.8	0.0	
301.30	301.40	0.7	422.1	0.0	1261.6	0.7C	839.4F	3.3	0.0	
301.40	301.50	0.1	422.3	0.0	1261.6	0.1C	839.3F	0.3	0.0	
301.50	301.54	0.0	422.3	0.0	1261.6	0.0C	839.3F	0.0	0.0	

Dam 4 (3)

TOTAL VOLUMES:

Cut:	422.274	(cubic meters)
Fill:	1261.576	(cubic meters)
Net:	839.302	(cubic meters) [fill]

APPENDIX D

SITE PHOTOGRAPHS

Approved Stormwater Discharge at Crown Road/Raymond Drive

View from unformed road to the railway

Assumed path of water from unformed road

Gravel causeway leading to box culvert under railway

Assumed path of water from gravel causeway

View of unformed road

Box culvert under railway

Existing Causeway in Kamilaroi Road & discharge of Natural Watercourse

Existing drain leading to gravel causeway

Path of water from existing drain

View facing south of causeway

View facing north of causeway

Waters approach to box culvert under railway

Box culvert under railway

From: Melissa Hundy
To: Kathryn Stewart
Subject: FW: CS0728678 - Onsite Detention of Stormwater-Kathryn Stewart
Date: Monday, 10 March 2025 3:22:38 PM
Attachments: image
image005.png
image003.png
image
image001.png
image009.png
image
image
image007.png
image
image
image
image001.jpg
image002.png
image003.png
image004.png
image005.png
250303_NSW Water Letter.pdf
Interpreting excluded works dams.pdf
When can I take water without an access licence_.pdf
Water supply work approval exemptions.pdf
Water use approval exemptions fact sheet.pdf

Hi Kathryn

Thank you for contacting WaterNSW.

I've reviewed your letter of 3 March 2025 which refers to dams/storages being used for the detention of stormwater and refers to harvestable rights and exemptions.

Detention basins are referred to in Schedule 1 Excluded works of the *Water Management (General) Regulations 2018*:

Clause/item 2
Dams solely for flood detention and mitigation—
(a) from which no water is reticulated or pumped, and
(b) that are located on a minor stream.

Please refer to the attached fact sheet 'Interpreting excluded works dams' for further information on what qualifies a dam/storage as a flood detention and mitigation dam.

The harvestable rights order defines an excluded work as any of the following:
a) a dam identified as an excluded work in clauses 1 - 4 of Schedule 1 to the *Water Management (General) Regulation 2018*
b) a dam that cannot capture rainfall runoff.

The harvestable right order only applies to the construction of dams on minor streams. Minor streams are determined using Hydro Line spatial data Water Management (General) Regulation 2018 Hydro Line spatial data | NSW Government Water

The harvestable rights order can be found at https://legislation.nsw.gov.au/view/pdf/asmade/sl-2023-542

The order states at 5(c):
A harvestable rights dam must not be constructed or used if, at the time of construction or first use of the harvestable rights dam, the dam is (or would be, if constructed):

i. on, in or within 40 metres (measured perpendicularly) of any river or stream that is not a minor stream,

ii. ii. on or within 3 kilometres upstream, including in or within the stream and within the catchment generally, of any Ramsar wetland.

According to the information provided with your letter of 3 March 2025:

- Storages 1, 2 and 3 appear to be located on minor streams,
- Storage 4 appears to be located at the confluence of two 2nd order streams, immediately upstream of a 3rd order stream.

It is important to note that a 3rd order stream is not a minor stream.

It is unlikely that Storage 4 would comply with the harvestable rights order or Schedule 1 Excluded works.

Dams located on 3rd and higher order stream are defined as an in-river dam. Therefore, it is important to note that Storage 4 is in the Mooki River Water Source of the Namoi and Peel Unregulated Rivers Water Sources 2012 Water Sharing Plan (WSP). Section 52(1A) of the WSP states that a water supply work approval must not be granted or amended to authorise an in-river dam within the Mooki River Water Source. Therefore, WaterNSW would not be able to accept an application for a water supply work approval to authorise Storage 4.

Dams constructed on minor streams in accordance with Schedule 1 are:

- Excluded from the calculation of maximum harvestable rights dam capacity
- Exempt from requiring a water access licence under s21(1) in accordance with Section 12 of Part 1 of Schedule 4 of the *Water Management (General) Regulation 2018*
- Exempt from requiring a water use approval under s34(1) in accordance with Section 12 of Part 1 of Schedule 4 of the *Water Management (General) Regulation 2018*
- Exempt from requiring a water supply work approval under s39(1) in accordance with Schedule 1 of the *Water Management (General) Regulation 2018*

Please note that the harvestable rights policy is a self-assessment policy, and it is the landholder's responsibility to ensure they comply with the policy. WaterNSW does not assess compliance with the harvestable rights policy. Any non-compliance would be investigated by NRAR as they are responsible for the enforcement of NSW Water Legislation.

While WaterNSW is responsible for assessing and determining applications for WaterNSW customers in relation to water access licences, water supply works approvals, use approvals and integrated development referrals, WaterNSW does not have a role in assessing compliance with exemptions under the Regulation. It is the landholder's responsibility to ensure they comply with any exemptions under the Regulation. Any non-compliance would be investigated by NRAR as they are responsible for the enforcement of NSW Water Legislation.

Kind Regards

Melissa Hundy
Water Regulation Specialist

[redacted]

Follow us on socials:

EXHIBITION COPY

Stewart Surveys, Pty Ltd

107-109 Conadilly Street,
PO Box 592
GUNNEDAH NSW 2380

Ph. (02) 6742 2966 office@stewartsurveys.com http://www.stewartsurveys.com

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S

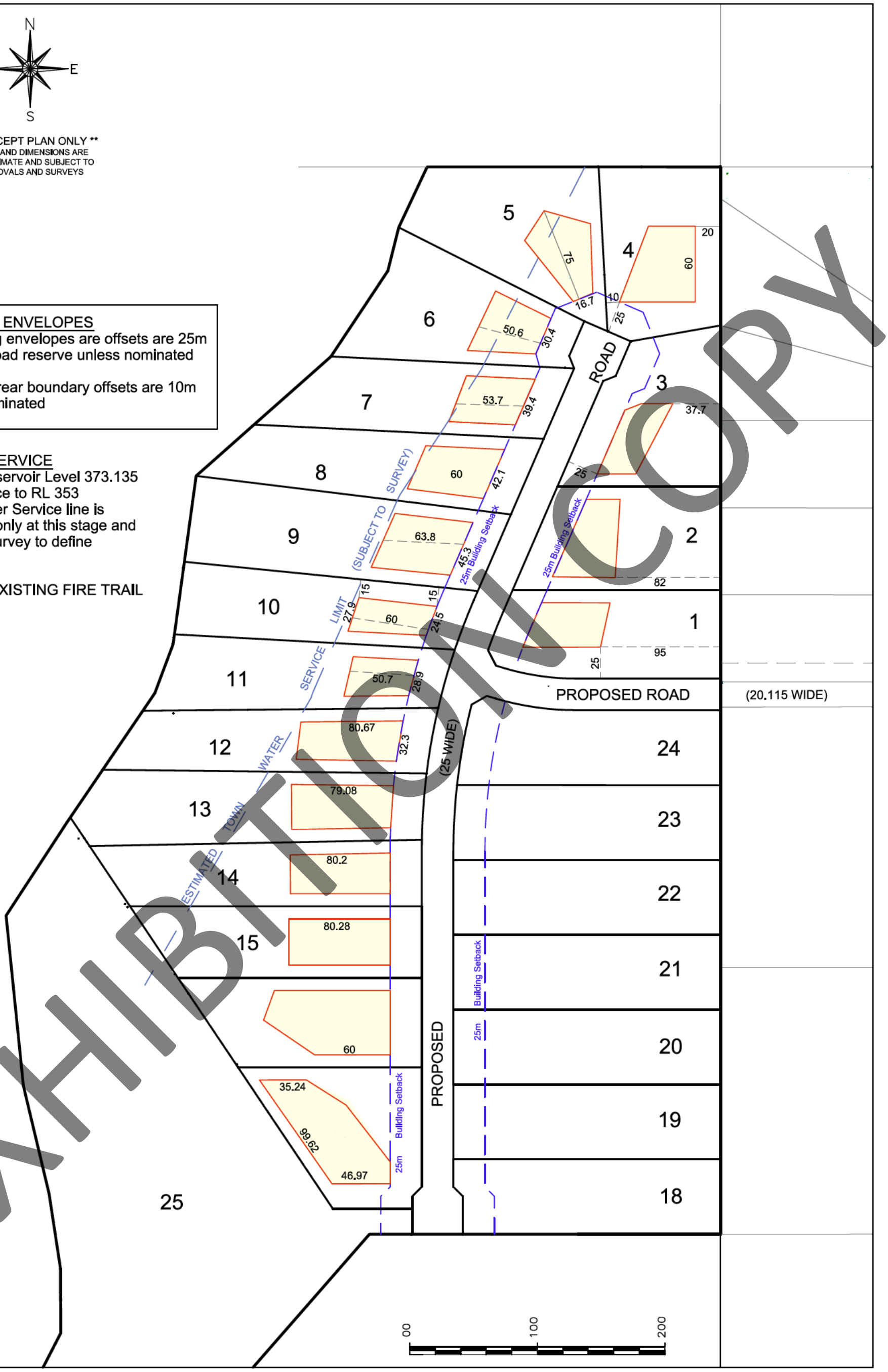
** CONCEPT PLAN ONLY **
AREAS AND DIMENSIONS ARE APPROXIMATE AND SUBJECT TO APPROVALS AND SURVEYS

BUILDING ENVELOPES
All building envelopes are offsets are 25m from the road reserve unless nominated

All side & rear boundary offsets are 10m unless nominated

WATER SERVICE
Gallen Reservoir Level 373.135
Can Service to RL 353
Note: Water Service line is indicative only at this stage and requires survey to define

EXISTING FIRE TRAIL



Stewart Surveys Local people Local knowledge	CLIENT: MR G. AVARD		DESCRIPTION: BUILDING ENVELOPES PLAN OF PROPOSED SUBDIVISION OF LOT 12 IN DP1244571		
	PROJECT: DEVELOPMENT APPLICATION				
	Date: 5 AUGUST 2025	File Ref: 5714	Drawn: KJS	Scale: 1:3000@A3	Sheet: 3